

STAKEHOLDERS' PERCEPTIONS AND ATTITUDES TOWARD THE  
MOUNTAIN LION (PUMA CONCOLOR) IN TEXAS

A Dissertation

by

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## ABSTRACT

The Texas mountain lion (*Puma concolor*) is found throughout the Trans-Pecos, as well as in the brush lands of South Texas. Though recent, continuing studies suggest the Texas mountain lion population is stable, hunters of the mountain lion have no limitations of season, number of animals, or methods used for harvest. There are no defined harvest management goals or strategies for the Texas mountain lion. The objective of this qualitative study was to define attitudes, perceptions, and values of hunters and wildlife biologists towards the mountain lion while developing an understanding of hunter and wildlife biologist engagement in mountain lion management. Purposive sampling was based on specific criteria of documented experience with the mountain lion in its natural habitat. Data was collected through a focus group, individual interviews, observational data, and archival data. Peer debriefing, audio taping, and use of case study protocol established trustworthiness.

Five main themes resulted from this inquiry. They were (a) value, (b) management, (c) knowledge, (d) profit, and (e) history. The most notable theme, value, was expressed as the mountain lions' benefit to the community, lifestyle, and the experience of encountering the mountain lion. Both hunters and wildlife biologists supported the continued existence of the mountain lion for the hunting experience and personal satisfaction. The most unanticipated theme is lack of knowledge and reliable reporting methods. Though there remains a negative perception of hunting, hunters have a positive attitude toward the Texas mountain lion and engaging community members. Wildlife biologists have a positive attitude toward engaging the public in implementing a

mountain lion management strategy. Common purposes were identified and described that may possibly be the foundation for future collaboration efforts and leadership training. Leaders among both hunters and wildlife biologists who are committed to collaborating and becoming change agents should be identified. Leaders should be trained to act as agents of change that are able to influence design and implementation of mountain lion management strategies that are accepted, effective, and sustainable.

## DEDICATION

This is dedicated to my children Alex and Olivia. I have been a student your entire lives and have been my motivation to continue my education. I promise to give you my time forever. I hope you know that it may take a while to be successful but it's worth the work. I will help you chase your dreams as you have helped me chase mine. I love you both.

To my husband Castronando, you supported me in ways that you don't even know. I look forward to helping you reach your dreams as you have helped me with mine.

To my father, a new heart and a new life were given to you. I pray that you live your second chance better than your first.

To friends and family who have supported

Most importantly to my mother. I cannot say enough about what you have done for me and my family. You have been there through three degrees, growing up, silly mistakes, and illness. Thank you.

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## NOMENCLATURE

ESA	Endangered Species Act
HWC	Human-Wildlife Conflict
IRB	Institutional Review Board
IUCN	International Union for Conservation of Nature
SCM	Social Change Model
TPWD	Texas Parks and Wildlife Department
WM	Wildlife Management
WSAC	Wildlife Stakeholder Acceptance Capacity

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## CHAPTER I

### INTRODUCTION AND LITERATURE REVIEW

The Mountain Lion (*Puma concolor*), also known as panther, puma, or cougar, is the largest cat in Texas. It is found through the Trans-Pecos, as well as the brush lands of South Texas, and portions of the Hill Country. The mountain lion is the most widely distributed felid in the Americas. Until the 1970's, the mountain lion was treated as a 'varmint.' There were active efforts throughout their range, including Texas, to eliminate them throughout the settled areas (Shaw & Negri, 2005). Texas has legally classified the mountain lion as a non-game animal. This designation provides no legal protection, designated hunting season, legal hunting methods, or bag limit (Pena, 2002). Unlike the states of Florida and California where the mountain lion is legally protected against all sports hunting, Texas continues to provide little to no protection for the species (Shaw & Negri, 2005).

Texas is the second most populous state and largest of the contiguous United States. Texas' 414 million ha is composed of 10 ecoregions ranging from the pineywoods of East Texas to the deserts and mountains of West Texas. Texas Parks and Wildlife Department (2002) stated that Texas has many wildlife species titled "nongame" that are vital to the ecology. One hundred eighty-four known animal mammal species in Texas have ranges as diverse as the landscape.

Aside from a state wide citizen science based monitoring programs such as wildtrack.org and efforts of the Texas Parks and Wildlife Department, for reporting mountain lion sightings and mortalities, all information on mountain lion population

ecology derives from studies conducted on state or federal lands in the Trans-Pecos region of western Texas where mountain lions are protected from harvest (Harveson et al., 2012). This 120 -150 pounds, solitary and elusive cat is difficult to research leaving many more questions than answers. However, general information widely available to the public about the mountain lion is incorrect and relies on myth and stories.

Listed as one of the top nine felids worldwide involved in conflict with humans (Thornton & Quinn, 2010), the mountain lion was previously considered an icon of the wilderness (DeStefano, 2005). Urban sprawl, the term used to describe the uncontrolled spread of human development into previously uninhabited areas (Casey et al., 2005), has resulted in greater human conflict with surrounding wildlife (Dickman, 2010; Casey et al., 2005). Texas has rapidly increasing urban sprawl (Texas Parks and Wildlife Department, 2002), the greatest threat to mountain lion management due to loss of habitat and land use (Logan et al., 2001). Misinformation, lack of knowledge, limited experience, and myth add to the burden large carnivores like the mountain lion carry (Matteson et al., 2006) for people concerned with their management. Design, development, and implementation of effective, acceptable, and sustainable management programs depends on understanding environmental interests, values, attitudes, and perceptions of key stakeholders (Shaw & Negri, 2005).

Wildlife are listed as imperiled, declining, vulnerable, at-risk, threatened, and endangered due largely to the rapidly increasing urban sprawl, human – nature disconnect, human-wildlife conflict, and land fragmentation (Casey et al., 2005). It is expected that wildlife-human conflict will continue to escalate in Texas as a result of: a)

habitat loss due to encroachment and fragmentation; b) adaptability of wildlife to urban landscapes; c) loss of hunters and anglers; d) decreasing attachment and interest in nature; e) decline in knowledge and self-reliance; and f) urban citizens transitioning to rural landscapes (Organ & Ellingwood, 2000).

Human-Wildlife conflict (HWC) is defined by the International Union for Conservation of nature (IUCN) “as any human –wildlife interaction which results in negative effects on human, social, economic, or cultural life on wildlife management” (IISD, 2012). HWC occurs when human population and wildlife requirements overlap creating competition and negative effects for both the residents and the wild animals that share the same environment, landscape, and resources (Rai, Chakraborty, & Shrestha, 2010). HWC is common to all areas where human populations and wildlife coexist and share limited resources (LeBel, Mapuvire, & Czudek, 2010).

A stakeholder is any individual who has an interest in a particular issue. More specifically, a stakeholder is, “a [person] who will be affected by, or who will affect, a management decision or action” (Redpath et al., 2013, p 102). Ninety-six percent of Texas land holds within the hands of private landowners. Perhaps no other group of stakeholders is more important to the future of Texas’ natural resources and endemic species diversity than private landowners. Large landowners are of particular importance in that they exert direct influence over vast stretches of habitat. Two stakeholder groups within Texas have the greatest influence over large landowners, positive or negative, hunters and wildlife biologists or managers. Hunters have unique networks and alliances and offer potential breadth to wildlife management advocacy. Wildlife biologists,

through research and understanding of local, state, and federal regulations have a unique set of skills important to management of land.

In the United States, wildlife is considered a common property owned publically therefore, policies depend on public acceptance (Zinn, Manfredo, Aske, & Wittman, 1998). Wildlife Stakeholder Acceptance Capacity (WSAC) defines the wildlife population level acceptable to a community of stakeholders at a given time and place (Riley & Decker, 2000). Tolerance varies with the species of concern, among and within stakeholders (DeStefano & Beblinger, 2005). Acceptable and sustainable management strategies should be created from social acceptance by key stakeholders and the communities they represent (Redpath et al., 2002). Successful management occurs when the outcome is acceptable to all parties with neither party asserting its interests to the detriment of others (Redpath et al., 2013). Attitude and perceptions of any stakeholder groups, especially key stakeholder groups with experience and networking, are the most important in developing wildlife stakeholder acceptance (Dickman, 2010).

Wildlife management (WM) is the leadership for decision-making, design, and implementation of management practices that impact human, wildlife, and habitat to achieve valued, acceptable effects for stakeholders (Riley, et al., 2002). Most controversial of wildlife management is management of large carnivores such as the mountain lion (Teel, Krannich, & Schmidt, 2002). Wildlife management is a confluence of our ethical responsibility to protect nature and increasing our understanding of how nature works (Logan, Sweanor, & Hornocker, 2001). Management is burdened with human emotions, attitudes, and perceptions. These perceptions and attitudes are not only

based on facts and personal experiences, they include wider societal experiences, cultural norms, expectations, and social structure positions (Dickman, 2010). Wildlife attitudes and perceptions may be classified as: a) extractive experiences such as hunting and fishing; b) appreciative experiences; and c) fearful and negative experiences. These all positively or negatively influence wildlife management (Deruiter & Donnelly, 2002).

Perceptions are interpretations of effects, becoming aware of, or identifying by means of the senses with the experience of a person, place, or thing. The interpreter's values and attitude influence and guide their perceptions (Riley et al., 2002). Community as shared norms and common interests depend strongly upon perceptions (Argawal & Gibson, 1999). Wildlife management issues deal with deeply held values and relationships with nature, its impacts on political interest groups, or stakeholders, and human interests (McIvor & Conovor, 1994). Different stakeholder communities may have varying perceptions of events or actions. Social groups most experienced with these events or actions are more likely to have a different perception than those who have no experience (Riley et al., 2002). Two stakeholder groups of shared norms such as hunters and biologists, with greater experience with the mountain lion in its habitat and those within their social structure and outreach, are likely to have greatly differing opinions than the general public.

Values are a small number of broad fundamental beliefs used to evaluate modes of conduct within a community (Zinn et al., 1998). They are the foundation of personal beliefs and decision making. An individual's values guide their view of the environment and changes within it (Deruiter & Donnelly, 2002). Members of a specific community,

culturally or by social structure, tend to ascribe to and share common values (Deruiter & Donnelly, 2002).

Attitude is the psychological tendency of an individual to evaluate an entity with favor or disfavor (Casey et al., 2005). It is their manner, disposition, and orientation with regard to a person place, or thing (St. John, Edwards-Jones, & Jones, 2010). Support for, or opposition to, wildlife and mountain lion management strategies may be considered attitudes (Dandy et al., 2012). The perceived impact of a species has been identified as a factor in determining attitudes towards that species and common conflicts with that species (Dandy et al., 2012).

Understanding why and how controversial species, such as the mountain lion, do not receive public support for protection in Texas, but do in other states, can aid in designing mutually beneficial management strategies for habitat, the mountain lion, and stakeholders involved (Sakurai et al., 2014). Consideration of human attitudes, perceptions, values, and acceptance of the Texas mountain lion should be included in designing, implementing, and sustaining effective management practices (Logan et al., 2001). Defining key stakeholder perceptions and attitudes toward wildlife is instrumental in discovering where and why conflicts occur with the mountain lion (Goldman et al., 2010). These conflicts may be due to human-wildlife contact or differences in and between stakeholder groups. Therefore key stakeholder participation in the development, revision, and implementation of mountain lion management strategies are vital.



## **Statement of Problem**

The Texas mountain lion evokes a strong difference of opinion between the general public who see them as charismatic, private land owners who see them as dangerous and ranchers and land managers that see them as a threat. Mountain lions have no management strategy in place in Texas. They are not protected nor is harvest of these animals regulated. Designing and implementing effective management strategies that regulate harvest and is mutually beneficial for people and the mountain lion requires change that must be accepted across a range of stakeholders. Identifying key stakeholders that would be best suited for affecting this change is essential to designing these strategies. These stakeholders, as leaders, may become change agents in their community introducing these management strategies in Texas.

The mountain lion is a keystone species, thus effective management benefitting mountain lions may positively affect the trophic cascade enhancing or prohibiting survival of other life forms living in intact ecosystems. (Logan et al., 2001). Successful mountain lion management includes enduring public support for sustainable populations and the habitat they need (Hornocker & Negiri, 2010) while considering the needs, desires, attitudes, and perceptions of people who reside within mountain lion habitat (Logan et al., 2001).

Government regulation has a tendency to raise stakeholder animosity toward the agency or entity responsible for implementation (Clancy & Jacobson, 2007). Resource policies may affect public perceptions and the potential for successful implementation (Stankey & Schindler, 2006). Species management including undesired management

strategies is no longer acceptable by stakeholders (Williams et al., 2011). Non-game classification of the mountain lion has made it more a controlled predator and trophy game species in Texas instead of managed big game (Shaw & Negri, 2005). The mountain lion is a wilderness icon deserving protection yet it still carries the negative perception as a threat to health and human safety (DeStefano & Beblinger, 2005).

Engagement of stakeholders in habitat management issues may greatly influence species management beyond the boundaries of government-protected areas. Federal public assistance programs for landowners (i.e. Wildlife Habitat Incentive Resource Conservation Service) and state administered programs exist, yet little research has examined factors that influence landowner engagement in wildlife management. Multiple management strategies are in use across the range the mountain lion. Development of these strategies is not always transparent to concerned stakeholders and may raise concerns that cast doubt on implementing acceptable strategies when not motivated to engage in management strategy design (Shaw & Negri, 2005).

Concern continues to be identifying those factors that engage stakeholders in management of wildlife (Poudyal & Hodges, 2009). Perceptions, attitudes, and values accepted in this generation are substantively inconsistent with those of prior generations. They have moved away from emphasis on virtue, honesty, obedience, and purity toward positive self-concept, appreciation of differences, and regards for nature (Deruiter & Donnelly, 2002). Positive wildlife perceptions, attitudes, and values may translate into improved and increased mountain lion management and improved, accepted, and sustained engagement of stakeholders (Wilcox & Giuliano, 2011).

Lack of social, political, and cultural acknowledgement has weakened management that is greatly centered on ecological, biological, and behavioral management of large carnivores (Bruskotter & Cowling, 2006). This impairs the ability to design and implement management strategies that are within WSAC. This may cause undue conflict and in management processes. Interdisciplinary work, including wildlife biology, social science and leadership studies, are needed to understand attitudes and perceptions toward wildlife and reconnect people with nature (Balmford & Cowling, 2006). This need has led to the Wildlife discipline of Human Dimensions to be listed as one of the nine priority research needs in the Cougar Management Guidelines (CMG) of 2009 (Thornton & Quinn, 2010). Calls for social science involvement came from scientists who understood human culture and activity as responsible for wildlife conflict (Hogan, 2007; Balmford & Cowling, 2006). Experts within the social sciences may be able to describe the attitudes and perceptions of key stakeholders (White, Jennings, Renwick, & Barker, 2005) enhancing the human dimensions requirement (Jacobson & Price, 1990).

Several factors influence human interaction with wildlife including: a) human population size and distribution; b) human needs, desires, and beliefs, c) psychological, cultural, historical, and economical conditioning; and d) norms, institutions, and laws shaping human behavior (Jacobson & Price, 2002). Wildlife management takes place within this complex structure of human-wildlife interaction. (Riley et al., 2002). Zinn et al. (1998) found a relationship between broad wildlife value orientations and specific

attitudes toward wildlife management. Highlighting the need for the inclusion of social science and leadership studies in wildlife management design and implementation.

Individuals occupying comparable positions within society have shared relationships and experience with wildlife and may elicit similar attitudes, these are social norms (Dandy et al., 2012). Social structure positions are created by social norms and societal influence (Kendall et al., 2006). The integration of human perceptions and attitudes based on experiential knowledge with biological and ecological understanding may provide accepted, and sustainable mountain lion management programs with high levels of sustainable stakeholder engagement (Riley et al., 2002).

Agents of change are citizens of a social group or society that have a common purpose and approach controversy with civility as leaders introducing new ideas, or innovation (Rogers, 2003). Diffusion of Innovation as described by Rogers (2003) suggests that communication of the new idea happens over a period of time. It must be accepted by a citizens within a social group who have the desire to affect change. A successful way for change agents to affect change is to influence the attitudes and perceptions of opinion leaders. Therefore, understanding perceptions and attitudes of stakeholders is important. Agents of change may be developed based on their consciousness of self and identified opportunities for collaboration. The may be key in defining new management strategies in not only the mountain lion but other controversial wildlife.

## **Conceptual Framework**

Three models were combined to develop the conceptual framework: (a) the Stakeholder Approach (Decker et al., 1996), (b) the Sphere of Human Experience and practice related values (Olilla,1996), and (c) The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996 (Figure 2).

Social structure positions or social groups have a network of relationships and hierarchy of leadership along with established mutual support. This social organization is influenced by culture, a set of beliefs and values, established by attitudes and perceptions, that are learned and shared with others who participate in that social environment (Figure 1). Pena (2002) suggested two key stakeholder groups with the most knowledge, experience, and influence are hunters and wildlife biologists. It is, in the case of the mountain lion, difficult and possibly not appropriate to change the culture of hunting or wildlife management. To most effectively design and implement sustainable management strategies, this network of relationships within these two key social groups may be capitalized creating leadership opportunities as agents of change while remaining sensitive to culture and relationships (Figure 1).

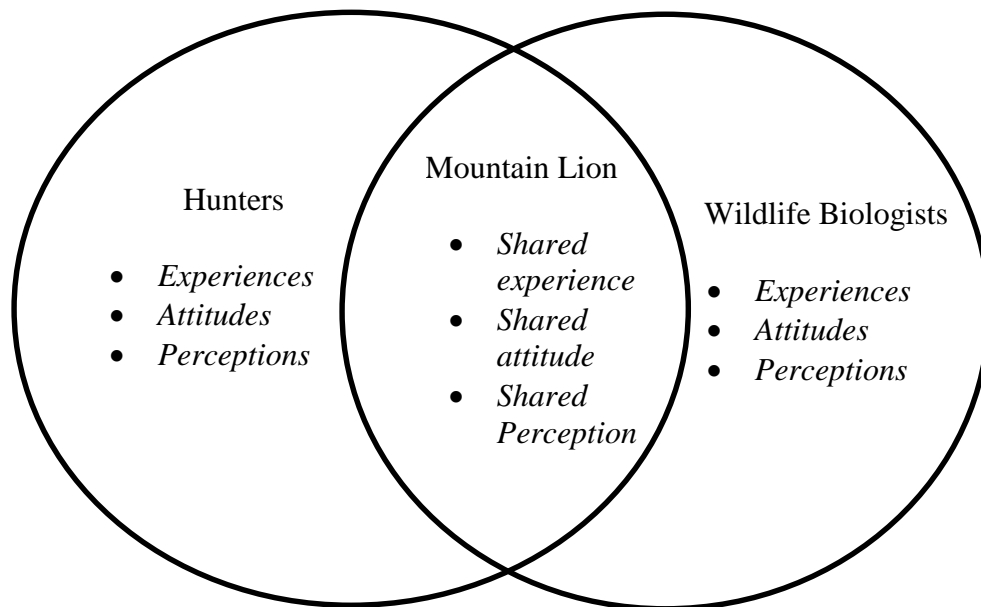


Figure 1. Hunters and wildlife biologists as key stakeholders in the stakeholder approach. Each stakeholder group is a social group having individual experiences, attitudes, and perceptions of the mountain lion.

The stakeholder approach as described by Decker et al., 1996, involves the realization that there are many stakeholders in wildlife management. These stakeholders are effected by management decisions with or without their knowledge. A broader interest in stakes has created a need for professionals to incorporate input from several groups, not only the traditionally recognized stakeholders.

In wildlife management, stakeholders may be difficult to define as they are any person who may be affected by management decisions. It is up to wildlife managers, researchers, and biologists, etcetera to understand and identify those who have stake in

management decisions. Hunters and wildlife biologists are defined as key stakeholders in this study because they have: (a) political influence, (b) legal standing, (c) power, (d) experience, and (e) moral claims (Decker et al., 1996; Susskind & Cruikshank, 1987).

The two social groups, hunters and wildlife biologists, though different in social influence, have the shared experience with mountain lions thus may have similar experiences, attitudes, and perceptions which may be influential across the realm of stakeholders and advantageous as agents of change. This is best illustrated as the sphere of human experience and practice-related virtues. A “virtue is an acquired human quality, the possession and exercise of which tends to enable us to achieve those goods which are internal to practice and the lack of which effectively prevents of from achieving any such goods” (Ollila, 1996, p. 118). By practice it is meant “any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are ... appropriate to and partially definitive of, that form of activity ..., and human conceptions of the ends and goods involved are systematically extended” (Ollila, 1996, p. 118). Examples of practices are farming, biology, chess and others which may be extrapolated to include hunting and wildlife biology and management. Internal goods are those that can be attained only through this specific practice and can only be identified and recognized by the experience of participating in such practices. Therefore, only those who have experience in mountain lion behaviors, human – mountain lion encounters, mountain lion habitat, etc., will be those who may recognize experiences relating to their practice.

Hunters and wildlife biologist may seem dissimilar in that one has a utilitarian, consumptive view of wildlife as the other may have a scientific and ecologic view of wildlife (Kellert, 1983). Despite the varying interest and intentions, concern with mountain lion management is central to hunters and wildlife biologists as seen in Figure 1. Further, these same concerns are central to politicians, landowners, and other influential stakeholders therefore their work is of interest across the stakeholder realm (Prus, 1996). Pena (2002) postulated that wildlife biologists and hunters may have significantly different views than the general public.

Perceptions of animals are related variously to four areas of concern: basic attitudes towards animals, attitudes toward, specific animal-related issues, knowledge and awareness of animals, and symbolic perceptions of animals (Kellert, 1983). Re-examination of stakeholder perceptions versus practice over time for programs, activities, and each other may reduce markedly faulty assumptions in mountain lion management program development and implementation (Wilcox & Giuliano, 2011). If community members, such as hunters and wildlife biologists, can identify shared beliefs and strategies through common experience, then other stakeholders may be more willing and able to engage in effective mountain lion management strategies (Figure 1).

The stakeholder approach described by Decker et al. (1996) and the sphere of human experience and practice-related virtues described by Ollila (1996) may be applied to The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996. This model approaches leadership as a purposeful, collaborative, value-based process resulting in positive social change (Komives &



Wagner, 2009). It is based on five key assumptions; (a) leadership is concerned with affecting change on behalf of others and society, (b) leadership is collaborative, (c) leadership is a process rather than a position, (d) all students are potential leaders, and (e) service is a powerful tool for developing leadership skills.

The goals of the Social Change Model include enhancing student learning and facilitating positive social change at the institution or in the community. It defines seven dimensions of values referred to as the Seven C's; (a) citizenship, (b) collaboration, (c) common purpose, (d) controversy with civility, (e) consciousness of self, (f) congruence, and (g) commitment. (Komives & Wagner, 2009).

Although this model of leadership was developed for use by students of leadership, it may be modified and applied to changing societal views of wildlife management programs and engagement with sensitivity to the culture of hunting and wildlife biology and management. In order for the model to be of greatest benefit, hunters and wildlife biologists would learn the model with emphasis on the second goal, facilitating positive social change at the institute and/or community. This is, collaboratively introducing actions that would assist communities in functioning more effectively and humanely. Hunters and wildlife biologists would in essence, design a collaborative leadership program using their sphere of influence to affect positive change on the community and their engagement in mountain lion management design and implementation creating a management scheme that is broadly acceptable, relevant, and sustainable (Figure 2).

Using the "Seven C's" that all work together to accomplish social change, a

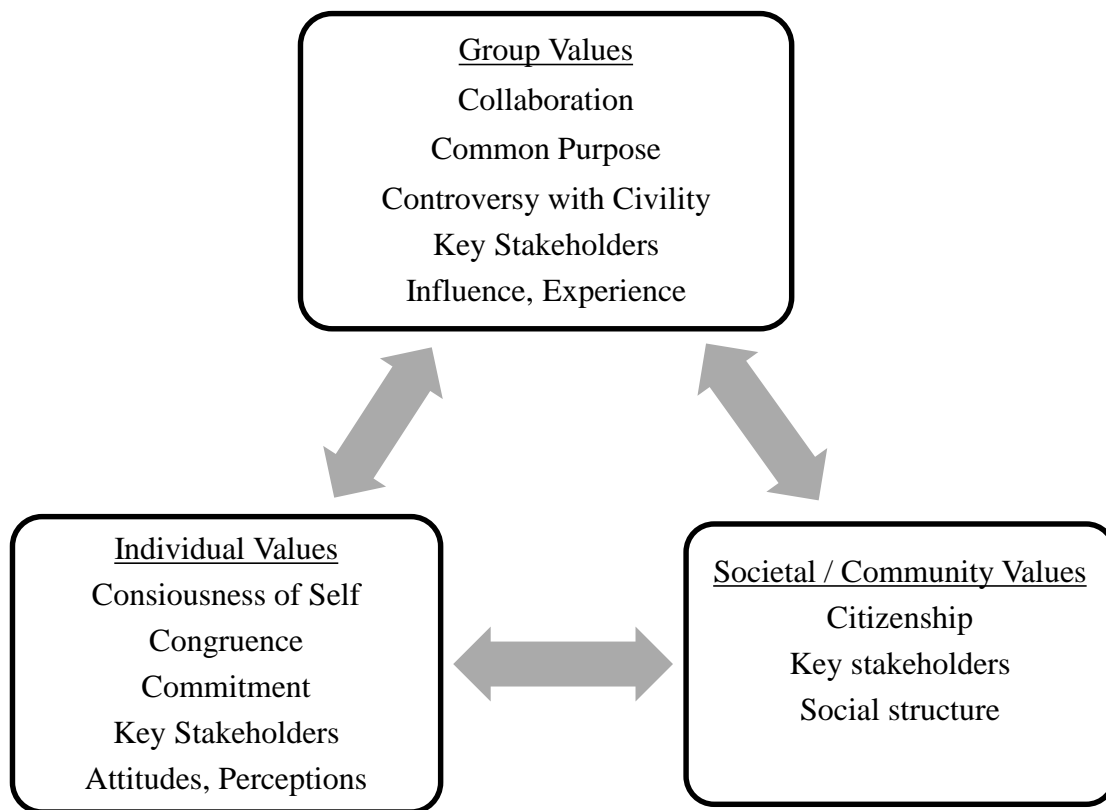


Figure 2. The social change model of leadership incorporating the stakeholder approach and the sphere of human experience and practice-related virtues. Reprinted from Komives & Wagner, 2009.

model may be developed that guides the hunter's and wildlife biologist's collaborative efforts into more meaningful actions developing programs that may contribute to the community accepting management programs for the mountain lion, and other species, that function effectively and humanely.

### **Previous Applications within Disciplines**

**Agricultural leadership, education, and communication.** Germain, Ellis, and Stehman (2014) investigated diffusion of innovation (Rogers, 2010) and promoting sustainable forest management. Diversity of owner demographics and other factors including, motivations, attitudes, preferences, attitudes, and knowledge make

implementing management strategies difficult. The research suggested that practitioners of forestry may intend to be consistent with forest management yet practices may fall short. Identification and involvement of key stakeholders may help reinforce the introduction of sustainable forest management strategies and positive stakeholder engagement.

Foreman and Retallick (2012) conceptualized leadership development using the Social Change Model (SCM) identify how experiences in extracurricular organizations result in increased leadership development. Through recognition of self and identification with a social group, students suggested that organizational leadership training should be increased. Lane and Chapman (2011) confirmed that individual engagement related to values may help build leadership capacity in various roles. Individual engagement increase and individuals perform at higher levels when they build upon their talents. This allows individuals freedom to choose actions they embody and enjoy fostering the choice (Mohanty, 2013). This creates synergy between stakeholders and unites efforts within an issue.

**Wildlife and natural resources.** Rose (2000) investigated African bushmeat commerce identifying key stakeholders within the trade. He developed a model of developing leadership within the key stakeholders using the concept of the SCM. He was able to incorporate a matrix of approaches to wildlife in order to develop key stakeholders into non-professional stakeholder communities. These communities would be agents of change in governing of commercial exchange of bushmeat. The study

suggested identification of crucial, social groups possessing the experience required to achieve management goals.

Educating key stakeholders such as hunters and wildlife biologist in leadership following the SCM may help develop the two social groups as agents of change. Further, Mohanty (2013) suggests that the SCM may help key stakeholders remain current and anticipate future developments that align with social and ecological demands while recognizing the objective of engaging stakeholders in creation of management strategies and influencing others to adopt them.

For developing leadership in wildlife management and conservation, hunters and biologists must foster a community of acceptance and become agents of positive change. Education in leadership and becoming agents of change must be linked to creating accepted, sustainable, and effective mountain lion management strategies that are inclusive of the values and beliefs of the culture of hunting and the culture of wildlife biology and management. Defining opportunities for collaboration and applying the Social Leadership Model may lead to developing unique and sustainable wildlife management strategies.

### **Purpose of the Study**

The purpose of this study was to identify the attitudes and perceptions of two stakeholder groups, hunters and wildlife biologists, toward the mountain lion (*Puma concolor*) in Texas. Further, this study was to identify opportunities for hunters and wildlife biologists to collaborate as agents of change in stakeholder engagement in effective, accepted, and sustainable mountain lion management.

## **Research Questions**

This investigation is reported in a three article format. Each article, presented as a case, has independent research questions.

Article 1. Hunter's attitudes and perceptions of the Texas mountain lion and stakeholder engagement.

1. What were hunter's attitudes toward the mountain lion?
2. What were hunter's perceptions of the mountain lion?
3. What were the hunter's unique experiences with the mountain lion?
4. How would hunters engage stakeholders in mountain lion management?

Article 2. Wildlife Biologist's attitudes and perceptions of the Texas mountain lion and stakeholder engagement.

1. What were the wildlife biologist's attitudes toward the mountain lion?
2. What were the wildlife biologist's perceptions of the mountain lion?
3. What were the wildlife biologist's unique experiences with the mountain lion?
4. How would wildlife biologists engage stakeholders in mountain lion management?

Article 3. Hunters and wildlife biologists as collaborative agents for stakeholder engagement in mountain lion management.

1. What were the similarities between hunters and wildlife biologists?
2. What were the differences between hunters and wildlife biologists?
3. What threats existed against implementing effective management strategies for the mountain lion?

4. What opportunities existed for hunters and wildlife biologists to collaborate for engaging stakeholders in implementing effective management strategies for the mountain lion?

### **Need for Study**

Time for developing and implementing management strategies is now, while mountain lions still exist in viable population sizes and with still sizable wild lands (Logan et al., 2001). Unfortunately, many management decisions are not based upon or substantially responsive to the growing body of diverse stakeholders, their attitudes and their perceptions (Shaw & Negri, 2005). In Texas, the sentiment for protection of the mountain lion is changing over time. This had been demonstrated in efforts to implement policy to assign the mountain lion as a game animal, protecting it by establishing hunting limitations. Qualitative methods have been underutilized for studies focused on wildlife, much less the Texas mountain lion. Wildlife agency personnel and program planners may apply greater understanding of attitudes and perceptions to design new, or increase participation in, existing wildlife management programs by fostering positive attitudes regarding the integration of wildlife and targeting key social groups (Willcox et al., 2012). Understanding perceptions and attitudes of key stakeholders while describing experiences with the mountain may lead to identifying opportunities for collaboration, building on leadership ability, and creating change agents. Trained in leadership by collaboration, the change agents will have the goal of creating accepted, effective, and sustainable management strategies that respect and support the cultures of hunting and

wildlife biology capitalizing on the influence of the members of the two societal groups on other stakeholders.

### **Limitations**

There were five main limitations to the study. First, Texas had imprecise documenting of the presence of the mountain lion. Biological studies are currently being conducted to assess the status of the mountain lion in Texas. Because of this, identifying prospective participants with required experience was challenging.

Second, the issue of mountain lion management was a highly political topic, with special emphasis on hunting or harvest of the animal. Because of this, many potential participants may not identify themselves due to the belief that this study is for a political purpose or belief that there will be some adverse action taken on them.

Third, there was a very small portion of the community within wildlife biologists and hunters that have documented, extensive experience with the mountain lion. Due to the small community, confidentiality was a major concern as telling one story may identify a participant.

Fourth, distance of mountain lion populations was a limiting factor. The two populations were at least 300 miles from the researcher therefore only two trips were made to Alpine, TX. Some participants were willing to meet in closer areas or over the phone making this study successful.

Fifth, the human is the instrument in qualitative research. Because of this, I needed to build rapport with the hunters. My ability to gain entrance into the community was based on my ability to communicate with them in a setting that was nonthreatening

and comfortable. Therefore, the focus group method was used. Wildlife biologists were a more professional group and concern for confidentiality was greater. Therefore, individual interviews were conducted. Interview questions and other protocols were the same.



## CHAPTER II

### HUNTERS' PERCEPTIONS AND ATTITUDES TOWARD THE TEXAS MOUNTAIN LION AND STAKEHOLDER ENGAGEMENT

#### **Introduction**

The Texas mountain lion (*Puma concolor*) is found through the western and southern portions of Texas (Harveson et al., 2012). Though recent, continuing studies suggest the Texas mountain lion population is stable, hunters of the mountain lion have no limitations of season, number of animals, or methods used for harvest. Further, there are no defined management goals or strategies for sustaining present populations. In West Texas, the main cause of death is attributed to predator control through hunting (Harveson, et al., 2012). Describing hunter's experiences with the mountain lion, and understanding their attitudes and perceptions, may lead to developing their leadership in designing successful, widely accepted, and sustainable management plans.

For hunters and other stakeholders, complexities arise between regulation, satisfaction and engagement in mountain lion management. In order to establish effective, accepted, and sustainable management practices, the public's perception is important yet understanding of the beliefs and attitudes toward wildlife management practices is often not part of the decision-making process (Dandy et al., 2012; Mangun, Throgmorton, Carver, & Davenport, 2007). Greater understanding of how hunters are likely to engage in management strategies of the mountain lion may aid in defining these strategies and gain support from stakeholders frequently involved in wildlife management processes.

Hunters have historically been leading advocates in conservation and the primary financial contributors to wildlife management in North America (Paulson, 2012; Adams et al., 2000). They are an effective advocacy group and source of funding through engagement of habitat protection, wildlife management, organizations, and license products (Ryan & Shaw, 2011; Paulson, 2012).

Hunters represent a range of attitudes toward mountain lion management (Kaltenborn et al., 2012). Unfortunately, hunters are continually defending their value of nature. They find their advocacy lost in trying to communicate their value of hunting and its value to wildlife preservation and conservation due to their negative association with wildlife concern and the practice of hunting (Kaltenborn et al., 2012; Paulson, 2012). The incentive that hunters have to preserve and conserve, is lost in the public's negative opinion of the sport.

Hunting is an opportunity to engage in social, psychological, emotional, and physically benefitting affiliations with friends, nature, satisfaction, and the outdoors (Daigle, Hrubes, & Ajzen, 2002; Kaltenborn et al., 2012). The majority of hunters do not own the land they hunt. Hunter often purchase leases or pay to go on hunting expeditions (Adams, Wilkins, & Cooke, 2000). Hunters build strong relationships with landowners and work closely with local stakeholders and politicians. Landowner's response to regulations may be best described by those who lease and use their land, specifically those who hunt (Mangun, Throgmorton, Carver, & Davenport, 2007). This makes hunters most capable of effective communication with politically conservative stakeholders historically opposed to environmentalists (Paulson, 2012).

## **Statement of Problem**

No mountain lion management strategy is in place in Texas. Mountain lions are not protected nor is harvest of these animals regulated. Designing and implementing effective management strategies that regulate harvest, and is mutually beneficial for people and the mountain lion, requires change that must be accepted across a range of stakeholders. Identifying key stakeholders that would be best suited for affecting this change is essential to designing these strategies. These stakeholders, as leaders, may become change agents in their community introducing these management strategies in Texas.

Individuals occupying comparable positions within society have shared relationships and experience with wildlife and may elicit similar attitudes, these are social norms (Dandy et al., 2012). Social structure positions are created by social norms and societal influence (Kendall et al., 2006). The integration of human perceptions and attitudes based on experiential knowledge with biological and ecological understanding may provide the foundation for developing mountain lion management programs with increased stakeholder engagement and acceptance (Riley et al., 2002).

Agents of change are citizens of a social group or society that have a common purpose and approach controversy with civility as leaders introducing new ideas, or innovation (Rogers, 2003). Diffusion of Innovation as described by Rogers (2003) suggests that communication of the new idea happens over a period of time. It must be accepted by a citizens within a social group who have the desire to affect change.

Successfully affecting change requires the influence of attitudes and perceptions of opinion leaders. Therefore, understanding perceptions and attitudes of key stakeholders is important. Agents of change may be developed based on their common purpose, consciousness of self and identified opportunities for collaboration. This may be key in defining new management strategies in not only the mountain lion but other controversial wildlife.

### **Conceptual Framework**

Three models were combined to develop the conceptual framework: (a) the Stakeholder Approach (Decker, et al., 1996), (b) the Sphere of Human Experience and Practice Related Values (Olilla, 1996), and (c) The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996.

Social structure positions or social groups have a network of relationships and hierarchy of leadership along with established mutual support. This social organization is influenced by culture, a set of beliefs and values, established by attitudes and perceptions, that are learned and shared with others who participate in that social environment. Pena (2002) suggested one of key stakeholder groups with the most knowledge, experience, and influence is hunters. To most effectively design and implement sustainable management strategies, the network of relationships within the group of hunters may be capitalized creating leadership opportunities as agents of change while remaining sensitive to culture and relationships (Figure 1).

The stakeholder approach as described by Decker et al. (1996) involves the realization that there are many stakeholders in wildlife management. These stakeholders

are effected by management decisions with or without their knowledge. Stakeholders have political interest, legal standing, and moral claims, Hunters are defined as key stakeholders in this study because they have: (a) political influence, (b) legal standing, (c) power, (d) experience, and (e) moral claims (Decker et al., 1996; Susskind & Cruikshank, 1987).

Hunters have shared experiences with mountain lions thus may have unique experiences, attitudes, and perceptions which may be influential across the realm of stakeholders and advantageous as agents of change. This is best illustrated as the sphere of human experience and practice-related virtues. A “virtue is an acquired human quality, the possession and exercise of which tends to enable us to achieve those goods which are internal to practice and the lack of which effectively prevents of from achieving any such goods” (Ollila, 1996, p. 118). By practice it is meant “any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are ... appropriate to and partially definitive of, that form of activity ..., and human conceptions of the ends and goods involved are systematically extended” (Ollila, 1996, p 118). Examples of practices are farming, biology, chess and others which may be extrapolated to include hunting and wildlife biology and management. Internal goods are those that can be attained only through this specific practice and can only be identified and recognized by the experience of participating in such practices. Therefore, only those who have experience in mountain lion behaviors, human – mountain lion encounters, mountain lion habitat, etc., will be those who may recognize experiences relating to their practice.

The stakeholder approach described by Decker et al. (1996) and the sphere of human experience and practice-related virtues described by Ollila (1996) may be applied to The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996. This model approaches leadership as a purposeful, collaborative, value-based process resulting in positive social change (Komives & Wagner, 2009). It is based on five key assumptions; (a) leadership is concerned with affecting change on behalf of others and society, (b) leadership is collaborative, (c) leadership is a process rather than a position, (d) all students are potential leaders, and (e) service is a powerful tool for developing leadership skills.

The goals of the Social Change Model include enhancing student learning and facilitating positive social change at the institution or in the community. It defines seven dimensions of values referred to as the Seven C's: (a) citizenship, (b) collaboration, (c) common purpose, (d) controversy with civility, (e) consciousness of self, (f) congruence, and (g) commitment (Komives & Wagner, 2009).

Although this model of leadership was developed for use by students of leadership, it may be modified and applied to changing societal views of wildlife management programs and engagement with sensitivity to the culture of hunting. In order for the model to be of greatest benefit, hunters would learn the model with emphasis on the second goal, facilitating positive social change at the institute and/or community. This is, collaboratively introducing actions that would assist communities in functioning more effectively and humanely. Hunters would in essence, design a collaborative leadership program using their sphere of influence to affect positive

change on the community and their engagement in mountain lion management design and implementation creating a management scheme that is broadly acceptable, relevant, and sustainable.

For developing leadership in wildlife management and conservation, hunters must foster a community of acceptance and become agents of positive change. They develop their leadership through understanding themselves consciously, individual citizen and as a group. This involves understanding and relating to shared experiences. They reflect within and throughout the group. As a group, they uncover their attitudes and perceptions that are common to and they may easily use to build collaborations and foster congruence. They can as a group commit to the common goal of stakeholder engagement in designing accepted, sustainable, and effective mountain lion management strategies that are inclusive of the values and beliefs of the culture of hunting and the respectful to those stakeholders they influence.

### **Purpose of the Study**

The purpose of this study was to describe the experiences of Texas hunters with the mountain lion and understand their attitudes and perceptions toward the mountain lion in Texas.

### **Research Questions**

1. What were hunter's attitudes toward the mountain lion?
2. What were hunter's perceptions of the mountain lion?
3. What were the hunter's unique experiences with the mountain lion?

#### 4. How would hunters engage stakeholders in mountain lion management?

### **Method**

This research used qualitative methods to build a complex, holistic, picture of the hunter's understanding of their lifestyle, their experiences, its impacts, and meaning they have in wildlife, specifically, mountain lion, management strategies (Merriam, 2009). The researcher used the case study method to facilitate an in-depth exploration of the experiences and motivations of hunters (Yin, 2009). The method was used to answer questions of why and how hunters would engage in mountain lion management. Merriam (2009) defined the case study as "an in-depth description and analysis of a bounded system" (p. 43). Denzin and Lincoln (2011) define the case study as "a detailed examination of a community" stressing developmental factors in relation to environment. Further, they write the case study comprises rich detail, completeness, and variance, for the unit of study that is relative to the environment.

The bounded system consisted of six hunters of the Texas mountain lion representing the two mountain lion populations found in the Trans-Pecos and brush lands of South Texas. The hunters served as the basis of the case study as they were a (a) social group, (b) of experienced and successful hunters of the Texas mountain lion, and (c) may provide essential information about stakeholder response to mountain lion management. Each hunter represented several decades of hunting the mountain lion and extensive knowledge and historical background of changes in mountain lion and other wildlife populations, wildlife value, and perceptions of the mountain lion by the hunting community.



## **Sampling Design**

Purposive nonprobabilistic sampling was used to discover, understand, and gain insight (Merriam, 2009) without the goal of generalizability but transferability (Lincoln & Guba, 1989). Purposive sampling sets criteria for representation during planning initial data collection (Denzin & Lincoln, 2011). It is a strategic choice of whom, Where, and how research is conducted. Miles and Huberman (1994) list six criteria for sampling strategy:

- a) Should be relevant to the conceptual framework and the research questions;
- b) Should be likely to generate rich information about the phenomenon to be studied;
- c) Should enhance the generalizability of the findings;
- d) Should produce believable descriptions and explanations;
- e) Should be ethical; and
- f) Should be feasible.

Avid hunters can provide essential information about stakeholder perception and attitudes toward the mountain lion as activity specialist having distinct opinions, desires, concerns, and preferences for management (Bryan, 1977).

The researcher attempted to collect all relevant information about the bounded case. Data were collected to reach a point of saturation. Data saturation is reached quicker the more homogeneous the participants are, the more structured the data collection instrument is (e.g. an interview protocol), and content complexity (Guest,

Bunce, & Johnson, 2006). In qualitative nonprobabilistic research, saturation is when no new information or themes are observed in the data.

### **Researchers Role**

The researcher sought and received permission from Texas A&M University's Institutional Review Board (IRB) to conduct this research. A well-respected hunter in the community put the researcher in contact with a group of avid mountain lion hunters. The group invited the researcher in November of 2013 to visit with the group. The researcher visited with the group in December of 2013 negotiated entry. Negotiating entry occurs when a caring community is constructed among researcher and practitioners (Connelly & Clandinin, 1990). All participants see themselves as participants in the study in which both the practitioners and the researcher have a voice.

### **Data Collection Procedures**

The researcher was the primary instrument of data collection and analysis (Merriam, 2009). Data were collected from a facilitated focus group, this consisted of a semi-structured interview of six key informants with experience as mountain lions hunters, publically attainable documents about the mountain lion in Texas and across the United States, and artifacts supplied by key informants.

All interviewed subjects were 18 years of age or older. The researcher transcribed what each interviewee said during the interview. The taped focus group discussion was transcribed verbatim for analysis. Transcripts were coded openly involving identifying, themes, naming, and categorizing topics found within the transcripts. The interview lasted 90 minutes. Additional questions, were asked if deemed

relevant. The focus group was interviewed in a restaurant familiar and comfortable chosen by the participants and was sometimes interrupted by other patrons.

### **Data Analysis**

The researcher transcribed all data except photographs. The transcribed data was reduced and given individual codes. Segments of data were separated out to be coded if they were (a) meaningful (or potentially meaningful) to one or more of the research questions (Merriam, 2009); and (b) were “the smallest piece of information about something that can stand by itself” (Lincoln & Guba, 1985, p. 345). Data segments were identified according to an auditing system (Table 1). With the audit tag, data segments cited in the analysis, results, and discussion phases could be referred back its location and context in the raw data. The audit tag combined the data type and source and separated the number identifier with a period. Participants were assigned aliases within the narrative. Aliases were identified with an alias audit system (Table 2).

Table 1. Hunter's data auditing system.

Code Category	Code	Code Explanation
Data Type	H, B, RR, DA AR	H: Hunter B: Biologist RR: Researcher Reflection DA: Document Analysis AR: Artifact
Data Source	1-999	Data sources within each type were given a number value
Page Number	1-999	Data sources within each type were given a number value
Line	1-999	Data sources within each type were given a number value
Construct	AT, P, V, AC	AT: Attitude P: Perception V: Value AC: Acceptance

For example, the data segment from hunter number one's interview and the construct attitude will be coded H1.4.56.AT. Further, participants were assigned an alias to enhance the narrative for confluence and imagery to effectively give voice to the participants.

Table 2. Hunter's alias auditing system.

Data Type/Source	Alias
H1	Alex
H2	Bill
H3	Chad
H4	Darlene
H5	Eric
H6	Fred

Data were analyzed using the five-tiered organizational approach described by Auerbach and Silverstein (2003). The five coding tiers are briefly described as:

- a) Relevant text: text related to the specific research concern or question;
- b) Repeating Ideas: similar words or phrases used to express the same idea by different participants;
- c) Themes: embedded topics that organize a group of repeating ideas;
- d) Theoretical constructs: the abstract grouping of themes; and
- e) Theoretical narrative: a summary of the research that “tells the story of the participants’ subjective experience using their own words as much as possible.”

### **Establishing Credibility, Bias, Consistency, and Transferability**

Credibility (referred to as internal validity in quantitative research) was established by collecting data from multiple sources (i.e. triangulation). Data were triangulated through interviews of hunters, researcher observations, and artifact analysis.

Respondent validation, which allows respondents to view, comment on, or revise what they said (e.g. during the interview) was used to increase credibility (Merriam, 2009). The researcher transcribed the interview and sent to respective participants for their review and comments. The researcher visited a location familiar and comfortable for the participants, visited areas of mountain lion sightings, visited homes of participants to gather artifacts and stories.

Research bias is a subjective bias towards a result expected by the human experimenter. For example, it occurs when scientists unconsciously affect subjects in experiments. Understanding research bias allows readers to critically and independently review the scientific literature and avoid results that are not credible (Pannucci & Wilkins, 2010). Researcher bias is more likely when the researcher is well versed on a topic adopting a defined attitude and perspective. Research bias was addressed by journaling the researcher's baseline understanding of mountain lion management and defining the opinion of mountain lion conservation. The research further documented opinions and attitudes toward hunting and the value of wildlife biology. Finally, the researcher reserved all review of relevant literature to after the interview process had concluded.

The researcher established consistency (referred to reliability in quantitative research) through the use of an audit trail, data triangulation, and reflexivity (Merriam, 2009). The audit trail consisted of the data auditing system (Table 1) of raw data, data alias (Table 2) and included peer brief, instrument development information, and proposal documents (Lincoln & Guba, 1985). Reflexivity, which is the process by which

the researcher reflects upon him/herself as the primary instrument of data collection and analysis, was addressed through the reflexive memo instrument. Peer briefing, which is a process by whereby the researcher shares preliminary findings, conclusions, and analyses with experts was used to increase credibility and consistency.

Transferability (referred to as external validity in quantitative research), was established by providing rich descriptions of the findings (Lincoln & Guba, 1985; Merriam, 2009). Thick rich descriptions of qualitative data are highly descriptive presentations of the setting and findings which help readers apply the findings in other contexts.

## **Results**

The following five major themes were found while analyzing data: a) Management, b) Value, c) Knowledge, d) Profit, and e) History. Unless otherwise noted, the researcher collected all artifacts presented in this section from December 2013 until June 2014.

### **Narrative**

“We hunt in Texas” is what he said to me as we drove to the restaurant, their daily coffee stop. I had driven into town to meet with four gentlemen and one lady, each an avid hunter of the mountain lion. These people had hunted for years, a few decades for most, and had informed me prior to agreeing to meet; they weren’t interested in anyone with a “government agenda.” I was kindly informed by Darlene, “you must be nonthreatening to reach them.”

The restaurant was busy, not packed, and laid back. Our table was near the front door and rather popular. People stopped by to pat someone on the back and make a joke or two. Each person present was well respected in this area. Coffee all around, they ordered two breakfast tacos for me and asked “What do you expect to get from this?” Truth is I only expect to find the right questions that may lead to a cooperative effort benefitting management of the Texas mountain lion. This amused them. “Go on then, tell me about you.”

They were a lively bunch. Their ages varied between 40 and 60 years old by their description. Eager to “get down to business” as Alex put it, I sipped my chocolate, turned on my recorder and started the interview. Easing into the tough mountain lion questions, I asked them to describe to me why they own land. There were chuckles around the table as Alex with his true Texas accent and vocabulary stated “so Bill could put his cattle on my land!” The table erupted in laughter. The mood was set for a great, yet semi-structured interview that quickly evolved into a candid conversation between friends about them, their life and their experiences with the mountain lion.

**Value.** As each participant spoke, others would add their thoughts and questions became conversations. The mood was light, many jokes about what seemed to be difficult topics such as mountain lion hunting and trapping. All were anxious to tell their part of wildlife in Texas and what they knew of the mountain lion. The gentlemen at the table are more than friends; they represent a community of hunters with decades of experience ranching and tracking the mountain lion. These gentlemen have worked “these parts” together for many years. They knew each other’s hunting habits, their



stories, their experiences, their land and their cattle. Many of them leasing land from Alex in order to keep cattle. During the conversation several themes emerged of what the hunting community valued; a) Community Benefit; b) Lifestyle; c) Experiential value; d) Existence; and e) Satisfaction.

***Community Benefit.*** The topic of wildlife and mountain lions is not just about the animals. It is about the impact they have on the surrounding environment and the people on it. “Land that doesn’t have wildlife on it... its nothing” Alex and Chad stated one feeding off the other. Of the group, Alex and Chad were the most outspoken. Their words however resounded in the others as they nodded their heads in agreement. The presence of diverse species of animals gives the air of wilderness to a community.

Land ownership and fragmentation is a problem for wildlife particularly the mountain lion due to the large range and land requirement. Alex with a serious tone commented that he was part of the land fragmentation problem. Later in the interview he anxiously described the impact of the mountain lion on the community. With a sober face he stated if there were a good lion population in the state, it would be an “indication of good ecological health.” The community should stand in support of having successful populations of the mountain lion in the state as it benefits the ecosystem. However, Alex states, “it’s amazing how poor the perception is” of the mountain lion.

***Lifestyle.*** Ranching and hunting go hand in hand with these gentlemen; it is their lifestyle for providing for their families and sport. To see each of them smile as they remember working the ranches in West Texas and hunting lions made me sit a little closer to listen. Bill looked around the table and thought about the reason he worked the

land. He stated “Dad’s gone; now you feel like you have to do it.” One after the other, they nodded their heads and agreed. In the winter, when they had more time for recreation, hunting was something they enjoyed. Chad stated “we all hunted lions.” Wildlife, including the mountain lion, provides the hunting experience and supports the hunting lifestyle.

***Experiential Value.*** Leaning back in his chair, hands crossed in his lap, Alex had just spoken with a gentlemen passing by the table. He told the gentleman he was answering questions about the mountain lion and that he should join the discussion. The gentleman declined and Alex turned back to the table. With a smirk, he said, “The hunting experience ain’t what it used to be when you’d take a 30/30 and a pocket knife.” I thought the others would laugh in agreeance but this was a serious statement. All only nodded. The experience of hunting was important to these gentlemen, and as a representative of the hunting community, I imagined it was important to all. Alex later went on to state that the experience of nature, being able to hear animals and see them “you can’t put a price on that.”

Chad tells me the story of his first hunting encounter while showing me his picture (Figure 3). “I was out trapping lions. I had set a trap in the bushes way out on the property. We thought it was an animal killing our livestock. It was my first lion and I was young. I remember walking up on it. It was pretty big; he had been snared by one of his back legs so he could still move around. At first I didn’t see him but boy I could hear him. I was so scared. I walked into the bush and there he was looking at me. I went to shoot him, missed and then fumbled around with my ammo so much that I dropped in all

on the ground. Finally I shot and killed him. But I was still so scared I sat down and couldn't move for a while. When I got up, I went to put the cat on my horse but it spooked the horse. He got mad and started bucking and such. I finally got him to settle down, put the cat on the back of the horse. But that was a mistake. The horse took off running. We went a couple of miles out of the way of the ranch. I ended up having to take my shirt off and wrap it around the horse's eyes just so I could control it. I was so far out and it was hot. The sun was bearing down for now my exceptionally long ride back to the ranch. I got there and was proud of my catch but I had a hell of a sunburn.



Figure 3. Chad's first experience hunting the mountain lion.

Although the experience has changed over time, from direct contact with animals to hiding in the tree stands and using technology, it is still important that the animal continue to have successful populations so that they and others might continue to experience the thrill in the hunt and the freshness of nature.

***Existence.*** Many people leave the suburbs to live in rural areas. They may do this for many reasons including being closer to nature and a part of wildlife. The presence of the mountain lion lends to drawing people to own land and visit communities. The mountain lion provides a feeling of wilderness and frontier described by Alex as “the last wild thing in Texas that would put a little chill up your spine if you run into him in the wild.” He continues stating, “I’d hate to see the day they’re gone.” Loss of the mountain lion in Texas would be a great loss to those who enjoy the experience of wildlife and hunting.

***Satisfaction.*** At the root of value is satisfaction. This satisfaction comes from a sort of selfishness in going after what you want. Owning land or leasing land is satisfying. As Bill stated you want to “feel close to the land... it’s what Texas really means.” I could feel the joy in the group as they nodded their heads and smiled. Chad later added “personal satisfaction.” A profound statement that satisfaction is necessary to continue to be part of the land, the experience of nature, and the desire to conserve it (Figure 4).



Figure 4. There is satisfaction in knowing the land and experiencing nature that is shared by all, including family.

**Management.** There's no substitute for spending time on your land, getting to know your land. Management of land is a true relationship between the land and its owner. It is a sense of pride in knowing that this is your land and no one can tell you what to do with it. Those who truly work the land do not need nor desire government oversight. However, many now lease land from owners who live elsewhere. Yet even with this fact, their leased land is their land, and they know it. Management has many facets; there is management of the land and management of the animals on it. Our conversation developed these themes; a) Ownership; b) Stewardship; c) Regulation; and d) Engagement.

**Ownership.** Large amounts of property are no longer owned solely by a proprietor that lives on and off the benefit of the land. Ownership is from a distance and

depends on relationships with other landowners and tenants. Alex describes land ownership and states “more people [are] on leased land and land that they’re taking care of” because land is too expensive to own and work yourself. It is absentee ownership. The owner of the land rarely lives on the land if anywhere near it at all. Bill chimes in “Fella’s in Brisco own it all.”

***Stewardship.*** Stewardship is caring for what matters to you. For ranchers, it may be their livestock. For hunters, it might be that one prize animal (Figure 4). Never the less, caring for them ultimately results in benefiting all, including nature. Alex, has a special background in this topic, he spent his life as a steward of the land in Texas. He served in many capacities, a biologist, a rancher, and a hunter. Alex is a pretty square man. When he speaks to you, he looks you in your eye and tells it to you his kind of straight “you can do both, graze cattle and support wildlife.”

As a rancher himself he admits, “Ranchers have to give a little bit to maintain diversity.” He sat forward and looked around the table. He speaks of the men around him in high regard as he tells me to back off his opinion a bit; they have made a living of working other people’s land. As hunters, the gentlemen have interacted with them during the chase but as ranchers, keeping someone else land, they have encountered the lion in both positive and negative situations. For them, there is the idea of them just being on their land. It makes their land, wild. Alex continues, “If the habitat is good then it’s good for everything out there they [mountain lion] can catch and eat that creates a prey base for them.”



Figure 5. Good stewardship includes creating a habitat suitable for the animal you hunt so you may continue to hunt it.

**Regulation.** The gentlemen take a lot of pride in their land. They know their land, they know the animals on it, and they have a genuine anti-government regulation sentiment. Chad speaks of the red tape and bureaucracy unpleasantly stating you don't "want anyone to dictate to you what you're going to do" on the land and with the land. The mood is a bit different; once regulation is mentioned, there is an immediate recoil and hesitation. Chad continues "[they're] going to tell you where to plow and how to do it and they don't know the last thing about it." The mood relaxes again when asked about regulation of the mountain lion.

Even with the feeling of disenchantment with government regulation, there is a realization that something needs to be done in order to protect the existence of the mountain lion in Texas. Alex explains "there ought to be some type of a program" he

leans back “you don’t want the numbers to get so low it’s hard to find a [mountain] lion in Texas.” Alex is very aware and quite passionate about preservation and conservation issues. Alex smiles stating, “you don’t have to be Aldo Leopold” the “father” of conservation to know how invaluable wildlife is. Alex suggests a program founded in fact and supported by the common stakeholder, “like these guys right here” stating you “shouldn’t kill the mountain lion at a certain time of year or take females.”

***Engagement.*** Landowners are interested in effective, sustainable management strategies for their land, livestock and the surrounding wildlife. Bill says they know there are programs available but do not know of them well enough to discuss them. He simply states that no one at the table participates. Alex however, does mention a method where stakeholders with large amounts of land use their land in hunting and conservation efforts. Alex states, “Private owners... buy up big chunks of land and eventually turn it over.” They often partner with different government entities in order to do so. Organizations such as The Nature Conservancy are donated large pieces of land in order to operate conservation areas, guided hunts and educational opportunities.

Though this is the case, the gentlemen do disagree with the effectiveness of state and national parks. As Bill explains, “[Big Bend] that’s a federal park and that’s the worst thing. [Mountain lions] are getting more used to people.” They all agree that it is a breeding ground for the mountain lion, which is a positive. Once away from the park, there are no management strategies. The men feel God put the mountain lion here for a reason; it’s an animal they have great respect for. They nod their heads in agreement



with Bill when he states, “Doesn’t hurt to be controlled if you have people who know how to control it.”

**Knowledge.** “Everything out there with claws and talons doesn’t need to be shot.” Alex is serious and the others agree. Alex continues explaining the difference in people in rural areas. Some of them work the land, they know the mountain lion, and they know the animals on their land. Then there are people who don’t know, worried about the unknown, understanding there may be animals on their land that may be dangerous. He shakes his head and asks, “How would you change that?” Knowledge is an acquaintance with truths, facts, or principles, as from study or investigation. Knowledge is a mixture of; a) Education; b) Information Sources and concepts or c) misconceptions.

**Education.** Education is key to appropriate mountain lion management strategies. Alex comments that though there are some that have actual experience with the mountain lion, many have only heard stories. He states, “Public knowledge of the mountain lion is pretty poor.” He continues the “more people that know about them, the better.” In jest, Darlene tells Alex he should come and educate folks, every morning. Everyone is smiling as Alex laughs and says he’s not necessarily a teacher. He thinks that balance should be taught though. Looking at me, as if this is my sole purpose in life and says, “Balance. That’s a good term, teach balance.”

**Information Sources.** The public’s known sources of information may be misleading or incorrect. There are many sources of information including word of mouth, the Internet and television. Alex admits most of what he knows he “read in the

newspaper.” He continues to describe stories of people seeing black panthers. Though he has never seen one personally, he knows that black panthers are not in Texas. He does say there are plenty of mountain lions around. They are doing well as far as he knows. There is habitat available that is beneficial to the survival of the cat.

There is an underlying distrust of mountain lion management, published population numbers, biology and general ecology. Fred is a well-known hunter in Texas. He is known by the group but did not participate at the same time. Fred began to speak suspiciously and quietly. Quite frankly, he began, the numbers of [mountain lions] are “inflated coming from wildlife and inflated numbers of animals actually trapped.” He spoke more forcefully as he stated, people “they’ve heard stories or maybe seen some tracks” yet many have never had contact with or seen a mountain lion. He was a frank and colorful person who continued by saying he didn’t think most hunters or trappers would be willing to speak about what they do.

***Misconceptions.*** Alex playfully calls some of the gentlemen at the table mountain lion murderers. They all smile and talk about an instance where mountain lions came in one night and killed 17 goats. That’ll change your mind about the animal pretty quickly they agree. I get the feeling; they found that cat, or maybe another close by. They express the great amount of misconceptions about the mountain lion. Even those who are educated misunderstand the presence of the mountain lion. Alex states, there are educated people that only know “it has claws and it’s dangerous.”

Those in the sheep and goat industry fear depredation by the mountain lion. Alex states that the mountain lion have “natural prey. They don’t have to eat goats.” Still, the

opinion of the mountain lion is skewed. Alex explains after all his years working and hunting the mountain lion; his wife “still walks outside at night looking for if there are any dangerous mountain lions.”

**Profit.** Mountain lions are respected and revered by most as long as they are not interfering with a rancher’s livelihood. Profit and protecting your income are major motivators in mountain lion management. Many ranchers are raising mule deer and others for game. Their land may be leased for hunting purposes or they may have guided hunts. The mule deer is a major part of the mountain lion’s diet, thus may have a negative impact on rancher’s profit and hunter’s success. Profit is necessary and a “*good thing*” in it provides (a) Livelihood; and b) Hunting.

**Livelihood.** It is expensive to have a working ranch, you may be land rich, but income based on livestock production alone is minimal. Looking around the table and then around the restaurant, Alex smiles and states, “If you’re trying to make money on a piece of land... shade your livestock under an oil well.” They discuss with each other the cost of cattle versus the cost of a prize buck. It is less costly to lease your land to raise cattle than to buy it.

The goat business used to be big in Texas some years ago, they all agree. All of them had worked a ranch at some point producing sheep and goats. Contact with mountain lions then was often, usually due to depredation. Chad explains to me that mountain lions are respected and revered as “long as they’re not destroying my livestock” he continues “not hurting my livelihood, then I like them around.”

**Hunting.** “When’s the last time you saw somebody pay \$20,000.00 for a good bull?” Alex asks with a smile. “People pay that much for a good buck!” Hunting creates a larger profit margin for ranchers. Hunting operations are numerous throughout Texas and in suitable mountain lion habitat. They all agree with Alex as he frankly states’ “wildlife makes more money than cattle.” This is, plain and simple.

The profits generated by hunting may be in turn used to sustain environments beneficial to wildlife as Alex points out, “Profit’s not a bad thing, it helps people justify using a piece of land and still leaving it so that it benefits all wildlife.” Helping ranchers and hunters understand the wildlife in the area and teaching them that it may provide an income increases the chance of engagement in conservation, preservation, and management practices. “Texans become a lot more altruistic when there’s profit in it” exclaims Alex.

**History.** Ranching is changing. Over time it has changed from sheep and goat, to cattle, and now hunting and recreational purposes. Chad shakes his head and states they “just hunt on it, they don’t ranch it no more.” Referring to the growing trend of absentee land ownership, they all discuss the loss of ranching to increasing hunting leases and “changing to recreational enjoyment.”

Wildlife population dynamics have changed over time. The amount of deer in Texas has increased. Alex stated there are “more deer in this state than we had in the 30’s.” Bill began to explain that there is an inverse relationship between deer and mountain lions. He stated that the lack of lions has allowed the number of deer to

increase and breeding for hunting further increases that. Bill states, I “was raised out here all my life and I didn’t see a mountain lion ‘til I was about 25.”

Management of wildlife has changed over time. “The 50’s, 60’s, and 40’s, they had trappers and government trappers,” Alex explains. In the “80’s and early 70’s the government trappers and all were using poison bait.” The responsibility of management has been part of the state and federal system in both a positive and a negative way. Due to this type of management “We didn’t have any lions, coyotes, or nothing down here because of the trappers and ranchers caught them.”

The introduction of deer hunting has helped the mountain lion strengthen its numbers. Alex and the others agree, “Deer hunting is good for mountain lions” it creates a prey base and decreases land used for livestock.

### **Conclusions, Implications, and Recommendations**

This study focused on Texas mountain lion hunter’s unique experiences with the mountain lion and their attitudes and perceptions towards it. Its findings, conclusions, and recommendations are based on hunters as individuals and as a group in order to understand how hunters may be able to engage other stakeholders in mountain lion management. The findings suggest that hunters, who have historically been dynamic agents of change for wildlife, have five major recurring themes that define their perceptions, and attitudes: (a) management, (b) value, (c) knowledge, (d) profit, and (e) history. Further, these themes are suggestive of ways hunters may influence stakeholders to engage in mountain lion management that is accepted, effective, and sustainable.

The study was conducted as a focus group for reasons including the researcher's entrance and acceptance into the group, but more importantly to offer individual participants time to reflect on themselves and become conscious of their experiences as well as the experiences of their friends and colleagues. The group setting allowed for participants to understand how they fit into the group, how their experiences are unique yet their attitudes and perceptions of the mountain lion are similar.

Each participant discussed parts of management issues that are most relevant to them. By doing this, they defined the common management issues, such as reluctance to engage in government led management programs. Even with this reluctance, there is an overwhelming desire to have some action in place for mountain lion management. They discussed stewardship, regulations, engagement, and land ownership. Of greatest concern to the hunters is absentee ownership. Absentee ownership has had an impact on the history of the land, its uses, and regulations. Positive impacts include leasing land for ranching, hunting, and other recreational sports allowing for other means of income from the land. Capitalizing on these positive impacts may create collaborative opportunities between hunters and landowners to influence engagement in management.

The value of the mountain lion extended to its benefit to the community, their lifestyle, the experience of hunting, satisfaction of the sport, and its existence. At the core, is the existence of the mountain lion as it effects the sport of hunting therefore the greatest motivation in developing and engaging in management of the mountain lion is to preserve it in the wild, to preserve the feeling of wilderness and continue hunting. The value of the mountain lion is what drives the commitment to preservation and

conservation. The ability to continue to hunt the mountain lion is the greater common purpose of hunter's engagement in designing management strategies.

Knowledge of the mountain lion was deemed poor between each other and with the greater public. Participants state they know little about the state of the animal in Texas and information about the cat mainly comes from print and televised news. They further admit that these sources are not reliable as many do not have actual experience with the mountain lion. Each participant agreed management must come from properly informed and educated stakeholders.

Key to management is profit as stated many times within the study. The driver behind preservation of land and wildlife is its ability to provide a living. The mountain lion is at times at odds with major stakeholders such as landowners and ranchers. This is because they are in competition for space and diet. The mountain lion's diet is believed to effect the income of ranchers who raise mule deer for hunting. Profit is a common goal with hunters as well as other large stakeholders. Profit may be identified as a topic for collaboration between hunters, landowners, and other organizations who do not usually support conservation efforts.

Hunters as a group identified areas where they may enhance their leadership abilities and become agents of change among other stakeholders thus promoting their engagement and acceptance of mountain lion management strategies. Developing hunters as influential leaders within their community addressing controversial issues, such as management that may include placing restrictions on mountain lion harvest, may be accomplished by adapting the Social Change Model (SCM) (Figure 2) to guide

facilitating positive social change within the hunting community through the societies where hunters may have greatest influence, landowners.

Modifying the SCM model would require including the identified topics that effected the hunter's attitudes and perceptions (management, value, knowledge, profit, and history) of the mountain lion based on their unique experiences (Figure 6). The model may present an approach to leadership in mountain lion management as a purposeful, collaborative, value-based process resulting in change in mountain lion management strategies.

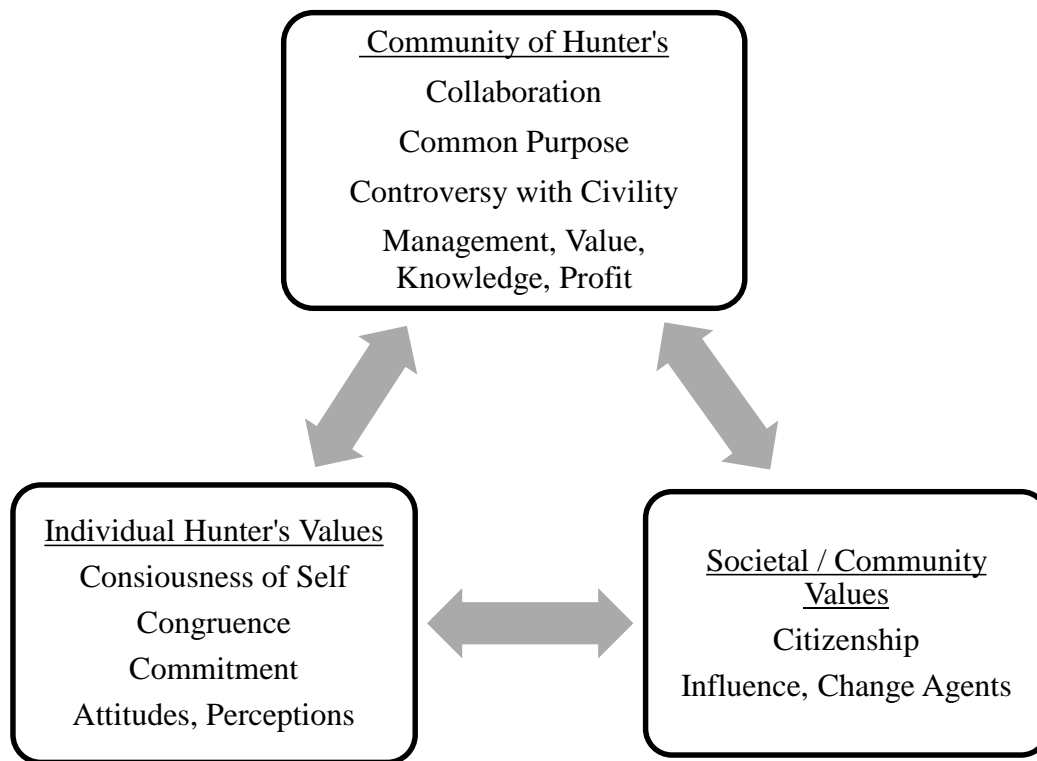


Figure 6. Modified SCM for leadership development in hunters. Reprinted from Komives & Wagner, 2009.



Opportunities should be created to develop effective leaders within the hunting community that may become agents of change. These leaders should be trained in a manner specific to their culture and values so that as individuals and a group, they may have congruence in management strategies. As hunters begin to outline new concepts in mountain lion management, they as trained leaders, influence others in a manner that, over time, changes how other stakeholders view mountain lion management. This may lay the foundation for future mountain lion management strategies that are acceptable, effective, highly engaging, and sustainable.

### **Future Research**

This study defined hunter's attitudes and perceptions, as well as reflections on experiences with the Texas mountain lion. Further, the study identified themes that suggested areas that hunters would most likely use as a reference for developing and implementing management strategies that are favorable and sustainable for the mountain lion and the stakeholder it affects. The hunter's show a respect for the mountain lion and desire to have some sort of management plan established in order to continue the existence of the mountain lion, for the benefit of the ecosystem and hunting for sport.

Using the stakeholder method defined by Decker et al. (1996), hunters were identified as a key stakeholder group. Another key stakeholder group may also be wildlife biologists as they have the sphere of human experience and practice related values (Olilla, 1996) giving them unique experiences and insights into mountain lion management. Future research should focus on defining wildlife biologist's attitudes and

perceptions of the mountain lion, their unique experiences, and how they would engage in mountain lion management.

After completion of the study, identifying areas where hunters and wildlife biologists might be able to collaborate may help define leadership opportunities and promote hunters and wildlife biologists working together as change agents. Developing the leadership skills to influence opinion leaders will require a leadership instruction that will include the hunters and wildlife biologists as students of leadership using the Social Change Model of Leadership (Higher Education Research Institute, 1996). Research may be done to assess the effectiveness of the model for developing change agents and creating leaders that may design, and implement mountain lion management strategies that are effective, accepted, and sustainable.

CHAPTER III

WILDLIFE BIOLOGISTS' PERCEPTIONS AND ATTITUDES TOWARD THE  
TEXAS MOUNTAIN LION AND STAKEHOLDER ENGAGEMENT

**Introduction**

The Texas mountain lion (*Puma concolor*) is found through the western and southern portions of Texas (Harveson et al., 2012). Though recent, continuing studies suggest the Texas mountain lion population is stable, there are no limitations of season, number of animals, or methods used for harvest. The mountain lion is provided some protection in Big Bend National Park as radio collared animals, however the majority of the Texas general population sampled by Pena (2002) falsely believed that mountain lions are included in some type of legal protection. Aside from a state wide monitoring program of reported mountain lion sightings and mortalities, population ecology, predatory behavior, and the massive land requirements (Linnell et al., 2001) all information on the mountain lion is obtained through studies conducted on state or federal lands in the Trans-Pecos region of western Texas where the mountain lion is protected from harvest (Harveson et al., 2012)

Currently, no strategy has been defined for management of the mountain lion in Texas. Wildlife biologists as wildlife managers are faced with having to manage wildlife populations amid a climate of increasing contact between humans and wildlife and changing attitudes of people toward wild animals (DeStefano & Beblinger, 2005). If wildlife managers want to retain influence in the management and conservation of mountain lions, they need to be responsive to the values of stakeholders (Logan,

Sweaner, & Hornocker, 2001). Wildlife management strategies vary across the states where the mountain lion exists. Wildlife biologists as managers, using input from stakeholders, are in a unique position to create and implement management strategies that are ecologically appropriate and widely accepted. In order to do so, wildlife managers must convey the human caring and emotional side of wildlife (Duda & Young, 1998). Understanding the attitudes and perceptions of wildlife biologists as managers may lead to creative management strategies that are inclusive to most, if not all, general stakeholders.

The goal of management agencies is to stabilize wildlife populations to avoid both risk of extinction, over-abundance, and human-wildlife conflicts (DeStefano & Beblinger, 2005). Putting plans into practice requires close involvement with implementing agencies and other stakeholders from the beginning (Balmford & Cowling, 2006) in order to highlight barriers defined by human values that prevent effective management (Redpath et al., 2013; Riley et al., 2002).

Management is not primarily about biology, but people, their attitudes, perceptions, and willingness to accept the species (Balmford & Cowling, 2006). Wildlife management depends on wildlife manager's responsiveness to the totality of society's perceptions, attitudes, and values while including key stakeholders who may influence special interest politics of other stakeholders (Decker et al., 1996).

Stakeholders in fish and wildlife management should be defined as those individuals and groups who may be affected by or can affect fish and wildlife management decisions and programs (Decker et al., 1996) including those who benefit

from human-wildlife interaction and those who such interactions create conflict (Riley et al., 2002). It typically includes individuals and groups who have legal standing, great political influence, and power to block implementation of decisions (Decker et al., 1996). Ultimately, stakeholders define and judge the relative importance of effects (Riley et al., 2002). People are the beginning, middle, and end of all management issues (Jacobson & McDuff, 1998).

### **Statement of Problem**

Mountain lions in Texas are not protected nor is harvest of these animals regulated. Designing and implementing effective management strategies that regulate harvest, and is mutually beneficial for people and the mountain lion, requires change that must be accepted across a range of stakeholders. Identifying key stakeholders that would be best suited for affecting this change is essential to designing these strategies. These stakeholders, as leaders, may become change agents in their community introducing these management strategies in Texas.

Individuals occupying comparable positions within society have shared relationships and experience with wildlife and may elicit similar attitudes, these are social norms (Dandy et al., 2012). Social structure positions are created by social norms and societal influence (Kendall et al., 2006). The integration of human perceptions and attitudes based on experiential knowledge with biological and ecological understanding may provide the foundation for developing mountain lion management programs with increased stakeholder engagement and acceptance (Riley et al., 2002).

Agents of change are citizens of a social group or society that have a common purpose and approach controversy with civility as leaders introducing new ideas, or innovation (Rogers, 2003). Diffusion of Innovation as described by Rogers (2003) suggests that communication of the new idea happens over a period of time. It must be accepted by a citizens within a social group who have the desire to affect change.

Successfully affecting change requires the influence of attitudes and perceptions of opinion leaders. Therefore, understanding perceptions and attitudes of key stakeholders is important. Agents of change may be developed based on their common purpose, consciousness of self and identified opportunities for collaboration. They may be key in defining new management strategies in not only the mountain lion but other controversial wildlife.

### **Conceptual Framework**

Three models were combined to develop the conceptual framework: (a) the Stakeholder Approach (Decker et al., 1996), (b) the Sphere of Human Experience and Practice Related Values (Olilla,1996), and (c) The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996.

Social structure positions or social groups have a network of relationships and hierarchy of leadership along with established mutual support. This social organization is influenced by culture, a set of beliefs and values, established by attitudes and perceptions, which are learned and shared with others who participate in that social environment Pena (2002) suggested one of key stakeholder groups with the most knowledge, experience, and influence is wildlife biologists. To most effectively design

and implement sustainable management strategies, the network of relationships within the wildlife biologist profession may be capitalized creating leadership opportunities as agents of change while remaining sensitive to culture and relationships.

The stakeholder approach as described by Decker et al. (1996) involves the realization that there are many stakeholders in wildlife management. These stakeholders are effected by management decisions with or without their knowledge. Stakeholders have political interest, legal standing, and moral claims, wildlife biologists are defined as key stakeholders in this study because they have: (a) political influence, (b) legal standing, (c) power, (d) experience, and (e) moral claims (Decker et al., 1996; Susskind & Cruikshank, 1987).

Wildlife biologists have shared experiences with mountain lions thus may have unique experiences, attitudes, and perceptions which may be influential across the realm of stakeholders and advantageous as agents of change. This is best illustrated as the sphere of human experience and practice-related virtues. A “virtue is an acquired human quality, the possession and exercise of which tends to enable us to achieve those goods which are internal to practice and the lack of which effectively prevents of from achieving any such goods” (Ollila, 1996, p. 118). By practice it is meant “any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are ... appropriate to and partially definitive of, that form of activity ..., and human conceptions of the ends and goods involved are systematically extended” (Ollila, 1996, p 118). Examples of practices are farming, biology, chess and others which may be extrapolated to include hunting and wildlife

biology and management. Internal goods are those that can be attained only through this specific practice and can only be identified and recognized by the experience of participating in such practices. Therefore, only those who have experience in mountain lion behaviors, human – mountain lion encounters, mountain lion habitat, etc., will be those who may recognize experiences relating to their practice.

The stakeholder approach described by Decker et al. (1996) and the sphere of human experience and practice-related virtues described by Ollila (1996) may be applied to The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996. This model approaches leadership as a purposeful, collaborative, value-based process resulting in positive social change (Komives & Wagner, 2009). It is based on five key assumptions; (a) leadership is concerned with affecting change on behalf of others and society, (b) leadership is collaborative, (c) leadership is a process rather than a position, (d) all students are potential leaders, and (e) service is a powerful tool for developing leadership skills.

The goals of the Social Change Model include enhancing student learning and facilitating positive social change at the institution or in the community. It defines seven dimensions of values referred to as the Seven C's: (a) citizenship, (b) collaboration, (c) common purpose, (d) controversy with civility, (e) consciousness of self, (f) congruence, and (g) commitment (Komives & Wagner, 2009).

Although this model of leadership was developed for use by students of leadership, it may be modified and applied to changing societal views of wildlife management programs and engagement with sensitivity to the culture of hunting. In



order for the model to be of greatest benefit, wildlife biologists would learn the model with emphasis on the second goal, facilitating positive social change at the institute and/or community. This is, collaboratively introducing actions that would assist communities in functioning more effectively and humanely. Wildlife biologists would in essence, design a collaborative leadership program using their sphere of influence to affect positive change on the community and their engagement in mountain lion management design and implementation creating a management scheme that is broadly acceptable, relevant, and sustainable.

Using the “Seven C’s” that all work together to accomplish social change, a model may be developed that guides the wildlife biologist’s collaborative efforts into more meaningful actions developing programs that may contribute to the community accepting management programs for the mountain lion, and other species, that function effectively and humanely.

For developing leadership in wildlife management and conservation, wildlife biologists must foster a community of acceptance and become agents of positive change. They develop their leadership through understanding themselves consciously, individual citizen and as a group. This involves understanding and relating to shared experiences. They reflect within and throughout the group. As a group, they uncover their attitudes and perceptions that are common to and they may easily use to build collaborations and foster congruence. They can, as a group, commit to the common goal of stakeholder engagement in designing accepted, sustainable, and effective mountain lion management

strategies that are inclusive of the values and beliefs of the culture of wildlife biology and management and the respectful to those stakeholders they influence.

### **Purpose of the Study**

The purpose of this study was to describe the experiences of Texas wildlife biologists with the mountain lion and understand their attitudes and perceptions toward the mountain lion in Texas.

### **Research Questions**

1. What were wildlife biologists' attitudes toward the mountain lion?
2. What were wildlife biologists' perceptions of the mountain lion?
3. What were the wildlife biologists' unique experiences with the mountain lion?
4. How would wildlife biologists engage stakeholders in mountain lion management?

### **Methods**

#### **Research Design**

This research used qualitative methods to build a complex, holistic, picture of the wildlife biologist's understanding of their lifestyle, their experiences, its impacts, and what meaning they have in wildlife, specifically, mountain lion, management strategies (Merriam, 2009) . The researcher used the case study method to facilitate an in-depth exploration of the experiences and motivations of wildlife biologists (Yin, 2009). The method was used to answer questions of how wildlife biologists would engage in mountain lion management. Merriam (2009) defined the case study as “an in-depth

description and analysis of a bounded system” (p. 43). Denzin and Lincoln (2011) define the case study as a detailed examination of a community stressing developmental factors in relation to environment. Further, they write the case study comprises rich detail, completeness, and variance, for the unit of study that is relative to the environment.

The bounded system consisted of four wildlife biologists in Texas having extensive experience with the two mountain lion populations found in the Trans-Pecos and brush lands of South Texas. The biologists served as the basis of the case study as they were a (a) social group (b) of experienced and successful interactions and knowledge of the Texas mountain lion and (c) may provide essential information about stakeholder response to mountain lion management. Each biologist represented extensive knowledge and historical background of changes in mountain lion and other wildlife populations, wildlife value, and perceptions of the mountain lion by the community.

### **Sampling Design**

Purposive nonprobabilistic sampling was used to discover, understand, and gain insight (Merriam, 2009) without the goal of generalizability but transferability (Lincoln & Guba, 1989). Purposive sampling sets criteria for representation during planning initial data collection (Denzin & Lincoln, 2011). It is a strategic choice of whom, Where, and how research is conducted. Miles and Huberman (1994) list six criteria for sampling strategy. In accordance with this strategy, those sampled

- Should be relevant to the conceptual framework and the research questions;

- Should be likely to generate rich information about the phenomenon to be studied;
- Should enhance the generalizability of the findings;
- Should produce believable descriptions and explanations;
- Should be ethical; and
- Should be feasible.

Wildlife professionals are usually not included as a factor in general population surveys since they compose only a small number in any society however biologists can provide essential information about stakeholder perception and attitudes toward the mountain lion as activity specialist having distinct opinions, desires, concerns, and preferences for management (Bryan, 1977).

The researcher collected relevant information about the bounded case. Data were collected to reach a point of saturation. Data saturation is reached quicker the more homogeneous the participants are, the more structured the data collection instrument is (e.g. an interview protocol), and content complexity (Guest, Bunce, & Johnson, 2006). In qualitative nonprobabilistic research, saturation is when no new information or themes are observed in the data.

### **Researchers Role**

The researcher sought and received permission from Texas A&M University's Institutional Review Board (IRB) to conduct this research. A member Texas wildlife society introduced the researcher to a biologist well respected in the state of Texas. The researcher negotiated entry during interactions and conversations over a period of three

months until the interviews began in January 2014. Negotiating entry occurs when a caring community is constructed among researcher and practitioners (Connelly & Clandinin, 1990). All participants see themselves as participants in the study in which both the practitioners and the researcher have a voice.

### **Data Collection Procedures**

The researcher was the primary instrument of data collection and analysis (Merriam, 2009). Data were collected during semi-structured individual interviews of four key informants with experience as biologists with extensive mountain lion background, publically attainable documents about the mountain lion in Texas and across the United States, and artifacts supplied by key informants.

All interviewed subjects were 18 years of age or older. The researcher transcribed what each interviewee said during the interview. The taped interviews were transcribed verbatim for analysis. Transcripts were coded openly involving identifying, themes, naming, and categorizing topics found within the transcripts. The interviews lasted approximately 90 minutes. Additional questions, were asked if deemed relevant. The participants were interviewed at locations comfortable and familiar to them. Some chose to be interviewed over the phone versus having the researcher travel to them.

### **Data Analysis**

The researcher transcribed all data except photographs. The transcribed data was reduced and given individual codes. Segments of data were separated out to be coded if they were (a) meaningful (or potentially meaningful) to one or more of the research questions (Merriam, 2009); and (b) were “the smallest piece of information about

something that can stand by itself” (Lincoln & Guba, 1985, p. 345). Data segments were identified according to an auditing system (Table 1). With the audit tag, data segments cited in the analysis, results, and discussion phases could be referred back its location and context in the raw data. The audit tag combined the data type and source and separated the number identifier with a period.

Table 3. Wildlife biologists’ data auditing trail describing coding.

Code Category	Code	Code Explanation
Data Type	H, B, RR, DA, AR	H: Hunter B: Biologist RR: Researcher Reflection DA: Document Analysis AR: Artifact
Data Source	1-999	Data sources within each type were given a number value
Page Number	1-999	Data sources within each type were given a number value
Line	1-999	Data sources within each type were given a number value
Construct	AT, P, V, AC	AT: Attitude P: Perception V: Value AC: Acceptance

For example, the data segment from hunter number one's interview and the construct attitude will be coded H1.4.56.AT. Data were analyzed using the five-tiered organizational approach described by Auerbach and Silverstein (2003). The five coding tiers are briefly described as:

- a) Relevant text: text related to the specific research concern or question;
- b) Repeating Ideas: similar words or phrases used to express the same idea by different participants;
- c) Themes: embedded topics that organize a group of repeating ideas;
- d) Theoretical constructs: the abstract grouping of themes; and
- e) Theoretical narrative: a summary of the research that "tells the story of the participants' subjective experience using their own words as much as possible."

### **Establishing Credibility, Bias, Consistency, and Transferability**

Credibility (referred to as internal validity in quantitative research) was established by collecting data from multiple sources (i.e. triangulation). Data were triangulated through interviews of biologists, researcher observations, artifact analysis, and peer brief. Respondent validation, which allows respondents to view, comment on, or revise what they said (e.g. during the interview) was used to increase credibility (Merriam, 2009). The researcher transcribed the interview and sent to respective participants for their review and comments. The researcher visited a location familiar and comfortable for the participants, visited areas of mountain lion sightings, visited homes of participants to gather artifacts and stories, and visited research areas.

Research bias is a subjective bias towards a result expected by the human experimenter. For example, it occurs when scientists unconsciously affect subjects in experiments. Understanding research bias allows readers to critically and independently review the scientific literature and avoid results that are not credible (Pannucci & Wilkins, 2010). Researcher bias is more likely when the researcher is well versed on a topic adopting a defined attitude and perspective. Research bias was addressed by journaling the researcher's baseline understanding of mountain lion management and defining the opinion of mountain lion conservation. The research further documented opinions and attitudes toward the value of wildlife biology. Finally, the researcher reserved all review of relevant literature to after the interview process had concluded.

The researcher established consistency (referred to reliability in quantitative research) through the use of an audit trail, data triangulation, and reflexivity (Merriam, 2009). The audit trail consisted of the data auditing system (Table 1) of raw data, data alias (Table) and included personal notes, instrument development information, and proposal documents (Lincoln & Guba, 1985). Reflexivity, which is the process by which the researcher reflects upon him/herself as the primary instrument of data collection and analysis, was addressed through the reflexive memo instrument. Peer briefing, which is a process by whereby the researcher shares preliminary findings, conclusions, and analyses with experts was used to increase credibility and consistency.

Transferability (referred to as external validity in quantitative research) was established by providing rich descriptions of the findings (Lincoln & Guba, 1985; Merriam, 2009). Thick rich descriptions of qualitative data are highly descriptive



presentations of the setting and findings, which help readers, apply the findings in other contexts.

## **Results**

All results presented are associated emergent themes along with experiences representing wildlife biologists' understanding of Texas wildlife and mountain lions and management programs. The following five major themes were found while analyzing data: (a) management, (b) value, (c) knowledge, (d) profit, and (e) history. Unless otherwise noted, the researcher collected all photographs and artifacts presented in this section from December 2013 until June 2014.

### **Management**

There are many challenges facing implementation of management strategies. The greatest of these challenges is the reluctance for landowners to engage in management programs. The participants expressed concern with changing management stating, "Land owners... have kind of a knee jerk reaction against participating in federal programs" (B2.3.75.A).

Landowners in Texas do not prefer engagement in federal, state, or local management programs. Participants agreed that opportunities for implementation of management strategies would be few if any without community involvement. This type of involvement may possibly encourage greater participation in management of the mountain lion with the caveat of limited government oversight. As stated by a participant, "Community would want as little federal or state interference" (B3.14.498.A). The theme of management had five subthemes (a) regulation, (b)

engagement, (c) ownership, and (d) stewardship. Each of these addressed community desire and biologist desire to develop sustainable mountain lion management strategy.

**Regulation.** Texas is the only state with existing mountain lion populations without any form of management. States like California and Florida have protected the mountain lion by law, where other states control populations by classifying it as a game animal. One participant states, “You can catch them and kill them any way you want, anytime of year” (B4.9.320.AC). This means landowners, trappers, and hunters may use any method of trapping and harvest desired (Figure 7). Participants recognize that many feel the “current management of the mountain lion is just what it should be” (B3.14.493.A), there is a core group that believe there should be “Some sort of management in the future” (B3.15.511.P).



Figure 7. Leg Trap used for trapping and hunting the mountain lion.

Participants agree that a community-based, cooperative management strategy would be most acceptable, yet not feasible. Participants agreed there's "no area that has an organized philosophy or program" (B4.12.433.A). Each expressed that the land area the mountain lion needs in order to remain a successful predator and exist at sustainable population number is so great that having an organized program is challenging. "There are few ranches large enough to contain even one mountain lion" (B2.14.479.AC). In one community, a landowner may welcome the mountain lion yet the next landowner oversees it as a predator and will trap and/or kill it. The mountain lion is "effected significantly based on what your neighbors are doing" (B2.14.481.AC).

There are very few tools with which to properly manage populations of the mountain lion. Trappers and hunters are the most use lethal control, yet wildlife biologist have "No tools with which to manage them...tools being regulations" (B2.14.472.P). Yet, wildlife biologists still believe management strategies should "come from the general population who know the lack of regulation" (B1.13.458.A). Further, they have the understanding that "general public, not landowners, [are] probably are supportive of some kind of management" (B1.13.461.A).

**Engagement.** There are other ways landowners engage in management. Many have a strong relationship with Texas Parks and Wildlife Department (TPWD). For state management projects "parks and wildlife has a very strong presence" (B1.2.53.P). Landowners engage in management for deer hunting operations, livestock operations, songbird diversity, and water. Though the motivation is, many times, more for monetary

value as a “tax write off for managing their land for wildlife” (B2.3.59.V). Most often landowners manage for “exotic removal ... There are big dangers out there” (B2.5.139.P). For the mountain lion, this may mean use of trap and release or hunting/harvesting.

Some participants do agree that engagement may be promoted through “mandatory reporting of takes by trappers and hunters” (B1.13.452.AC). This would not take away the right to trap or hunt or define how they would do so. This would only require reporting the number you have harvested in order for TPWD to have a greater understanding of the number of mountain lions in the state and other biological factors such as genetics and range.

**Ownership.** Land ownership is now predominantly “absentee or retiree demographic” (B2.65.P). Many owners no longer live on their land, yet support it by “maximizing cattle production and sustainability” (B3.3.84.V) using hired hands and leasing. Those who are hired hands care for the land and animals. Those who lease land care for their portion and the animals they have on that land. Both are suggested by the participants to understand more about the land than the actual owner.

**Stewardship.** Wildlife biologists agree that the majority of the population are genuine stewards of the land. They express that most “try not to hurt the land by overgrazing or something” (B4.2.39.A). Yet they explain that stewardship “needs to be an active process” (B2.5.131.A). Becoming a good steward of the land is more than just trying not to hurt the land, it is about preserving ecosystems and retaining the natural hierarchy of prey. The mountain lion is a keystone species, meaning species below it

will suffer causing numbers to become too low or numbers will increase and cause suffering. They continually expressed the need to “keep healthy populations” (B1.13.452.A).

### **Value**

Value of the mountain lion and wildlife is defined in many ways. There is the monetary and lifestyle value, the value of their existence, satisfaction and experiential value. Biologists believe that overall, their experience is there is a “good positive attitude... supportive of taking care of the wildlife” (B1.4.112.A). The general community has a reverence for the mountain lion and describe it as adding a feeling of “wild” to the community.

Speaking to one participant, you could see the excitement in his face and the enjoyment of discussing the mountain lion and describing his feelings. He spoke with drama and feeling, was quite animated as he illustrated the hunting ability of the mountain lion.

They’re able to go out on the land and jump out of a hiding place and grab an animal with their bare hands and kill it. That’s a pretty amazing skill to be able to do consistently enough to do your entire life that you never die of starvation.” (B2.7.227.P)

While he was truly excited, each participant stated the same, the mountain lion is an invaluable member of the Texas landscape.

**Existence.** Existence of an animal has many implications, health and human safety, stability of an ecosystem, market value, and more. The mountain lion is an

animal that creates ecological stability. It is an “apex carnivore... effect[ing] the entire part of our system” (B1.6.162.V). Further, “large predators are an indication of good habitats” (B2.12.405.V).

The removal of keystone species has unintended outcomes. Landowners will remove a carnivore whose prey is rabbits, but he grows food rabbits like. The predator he removed now doesn't help the landowner with rabbit control and they rabbits destroy his crops. The consequences of losing the mountain lion may be greater than we can afford. On the same token, more mountain lions than can be sustained in a community causes prey shortages and increasing instances of mountain lions in urban areas. Each of the participants had their own idea of what their existence meant to them but one summed it up as, “I'm glad we've got them, we'd be poorer if we didn't” (B4.10.345.P).

**Lifestyle.** The mountain lion as well as all wildlife, has an effect on lifestyle. Those animals hunted for sport support a certain type of lifestyle, and those deemed charismatic support a different lifestyle. Many who hunt are described as “utilitarian, many of them grew up hunting and spending a lot of time outdoors so there's a little more of a tactile, get out in it rougher sort of approach” (B2.4.117.AC). Others enjoy the “wild” and find it to be a “calming a spiritual renewal sort of stuff” (B2.4.127.A). Each participant agreed, residents of rural areas would not live there and “they wouldn't be ranching if they didn't love where they were” (B3.5.149.A).

**Satisfaction.** Satisfaction for the participants has a greater definition than satisfaction in self, or selfish reasons. Their satisfaction comes from wildlife, where they live, and what they love to do. The mountain lion to biologists and to the general public

is a “charismatic carnivore that draws interest and attention” (B2.8.279.P). The mountain lion is a symbol of the wild. It is an animal that is revered and people enjoy knowing they are around. For the biologist they agree that, “you become a wildlife biologist because you love wildlife, you love the outdoors, and have a large appreciation for the mountain lion” B2.6.215.A).

**Experiential Value.** Experience is best told with a story and difficult to explain as one of the participants stated. His experience changed the way he viewed the mountain lion, his respect for them, their curiosity, and their intelligence.

My wife and I were camping in the really remote area in Arizona and we saw lots of mountain lions coming into that area. That night a mountain lion circled our tent and screamed really loud. It wasn’t directly circling our tent, it was maybe fifty yards away but it made a circle around our tent screaming which was a really interesting experience. The next day we found the tracks all on top of our tracks, it was really neat. I have spent a lot of time identifying lion tracks and getting interested in their behavior (B2.6.189.A).

Each participant had their experiences, their valued interactions, and their interest in the mountain lion. One participant expressed “the view, the scenery, the wildlife and the outdoor opportunities” (B1.4.101.V) build her experience. These parts of wildlife are important, each affecting the other. Experiential value should be considered in its entirety. The scenery, the animals, the activities make up many aspects of the wildlife experience. The mountain lion is one element of the entire experience. As one

participants stated, “a healthy population in the area you’re living in well, you’re living in a pretty nice place” (B4.12.440.A).

## **Knowledge**

Actual knowledge of the animal and knowledge available was difficult to measure, or understand. Each participant feels that knowledge is greatly lacking in different areas of mountain lion biology, ecology, dangers, etc. Although there are many resources on the Internet and other ways to access information, such as TPWD classes, most of the information received by the public includes misrepresentation of the mountain lion, incorrect information, and hyperbole. One participant expressed frustrations in the voluntary reporting system because “voluntary reports fluctuate based on many factors unrelated to mountain lions” (B2.7.237.P). These factors range from television shows to the time of year. From the knowledge theme, three subthemes were identified; (a) information sources, (b) education, and (c) misconceptions.

**Information Sources.** There are many different information sources available to the general public. Most often, their information may come from television news, television shows, Internet, and newsprint. Much of the information immediately available is not accurate. All participants agree there is “not a lot of accurate information” (B1.6.182.P). For researchers, peer-reviewed information in reputable journals is easily accessible. The general public has no ability to benefit from these resources. Because of the lack of resources, participants believe “people are just uninformed” (B4.15.546.A).



Being uninformed is not always the fault of the public, all forms of media have varying types of information available, mostly in a sensational manner. One participant suggested that mountain lion sightings increase after a prominent television show airs a story about mountain lion, real or not. After events like this, numbers of sightings increase. He states, that the reports tend to come from urban areas versus rural where the animal would most likely be. He did admit that, rural communities rarely report sightings, as they are used to living with mountain lions.

**Education.** The mountain lion is a highly studied animal, yet there is still much to learn. There is much known about the mountain lion, its biology, its habitat, and its range, even though “research on cat populations is extremely difficult because you are literally trying to count America’s most stealthy animal” (B2.8.254.P). Further, research is further hindered by the fact that “even most mountain lion biologists that work with wildlife might only see a mountain lion when they have dogs chasing it up a tree and they dart it to put a collar on it or something” (B2.7.203.P). This creates a disconnection in what is known and what is not known. The researcher using techniques of tracking with dogs and darting animals interferes with the natural behavior of animals thus reporting part of the information about the animal.

**Misconceptions.** There are many misconceptions about the mountain lion. The participants describe many misconceptions such as the status of the mountain lion in Texas, their diet, how dangerous they are, and where they live. Many believe that the mountain lion in Texas is endangered; biologists state, “I don’t think they’re in eminent danger, they may need help ultimately (B1.6.171.P). Misconceptions are dangerous to

managing the mountain lion because “real issue or not, it doesn’t really matter because people are worried about it” (B2.12.416.A).

### **Profit**

Profit has a great influence on the management of the mountain lion. Livestock producers and hunting ranches depend greatly on their land and their animals to make a living. The mountain lion, according to the participants, effects profit through livelihood and the benefit of hunting.

**Livelihood.** The mountain lion management has an effect on certain livelihoods. Deer hunting ranches are the most probable victims of mountain lion predation while livestock operations have the perception of being impacted by mountain lion predation. “A lot of deer hunting operations where if a mountain lion are eating their deer and each could potentially bring in a couple thousand dollars then there’s potential that their competing for resources and also if there’s a livestock operation and the mountain lions are killing a certain number of cattle or sheep and goats then that could lead to areas of conflict.” (B2.11.389.P)

Land required for animal operations, is very expensive. Owners “buy land in some cases for hundreds of millions of dollars so it’s an extremely large investment” (B2.1.18.V). Any profit loss may pose a great financial challenge to the landowner, thus these community members are more likely to not engage in mountain lion management outside of trapping or lethal.

**Hunting Benefit.** Hunting is a profitable and wildlife is a commodity. Deer, sheep, and mountain lions are integral in the hunting culture. Profits are typically greater

than that of livestock. Biologists agree, “Deer are the highest income producing wildlife (B1.4.106.V). Mountain lions “conflict between ranchers that have hunting leases and get some of their income from hunting deer” (B1.11.368.V). “Lions definitely affect deer populations what we’re trying to find out if it is a positive effect on landowners and lions” (B1.11.372.V).

## **History**

Big ranches have been part of the Texas landscape “forever so the average would be something like 30-40 years” (B1.1.3.P). 40-50 years ago there were probably nine million people in Texas and now its 20 million or something so the population is steadily increasing Land Use (B4.10.290.P). Creating a “large shift to newer land owners” (B3.2.29.P). Population increases and increasing use of the land for agriculture have historically affected all wildlife, including the mountain lion. This history also effects how the community views wildlife management.

**Wildlife.** Wildlife was previously treated as unwanted pests or threats to livelihood. This caused government funded extirpations of animals perceived as threats. Wildlife was not humanly removed from areas where it was unwanted. Citizens were allowed to place poison bait, traps, and shoot on sight. There were great losses of many species “historic removal of wolves and bison” (B2.5.142.AC) and the “loss of those species on the landscape has changed the balance of the landscape” (B2.5.143.AC). Mountain lions were one of the species that suffered from early management programs. “Considering they used to cover all of Texas and to some degree and now they’re in two almost possibly isolated populations” (B1.6.174.AC). Since these programs were

terminated, many species have recovered wither naturally or by introduction. The “Texas [mountain lion] is expanding repopulating areas that they previously lost” (B3.9.290.P).

**Wildlife Management.** Learning from previous management issues, and losses of species diversity in the state of Texas, wildlife management is a priority. The mountain lion is of interest as it is “one of the few large carnivores we have in North America” (B2.7.217.V).

### **Conclusions, Implications, and Recommendations**

This study focused on Texas wildlife biologists’ unique experiences with the mountain lion and their attitudes and perceptions towards it. Its findings, conclusions, and recommendations are based on wildlife biologists as individuals and as a group in order to understand how wildlife biologists may be able to engage other stakeholders in mountain lion management. The findings suggest that professional wildlife biologists have the community support and influence to become dynamic agents of change for wildlife, have five major recurring themes that define their perceptions, and attitudes: (a) management, (b) value, (c) knowledge, (d) profit, and (e) history. Further, these themes are suggestive of ways wildlife biologists may influence stakeholders to engage in mountain lion management that is accepted, effective, and sustainable.

Each participant discussed parts of management issues that are most relevant to them. By doing this, they defined the common management issues, such as reluctance to engage in government led management programs. This reluctance is further exacerbated by the challenge of community engagement due the needs of the mountain lion as migration routes cover great distances and traverse ownership and political boundaries.

They discussed stewardship, regulations, engagement, and land ownership. Greatest concern for wildlife biologists was the lack of regulation on trapping and harvest. The overall attitude is there should be some form of management in the future that is based on biology and behavior, ecology, and is cooperative. Cooperation may be a challenge as there is no organized philosophy or program for management.

The value of the mountain lion extended to its existence, lifestyle, personal satisfaction, and individual experiences. The value of the mountain lion among wildlife biologists was firmly rooted in the mountain lions benefit to ecology and its interaction with wildlife at lower trophic levels. They expressed that the mountain lion is an apex predator, its abundance and stability within an ecosystem has an effect on the tropic cascade.

Knowledge of the mountain lion was deemed poor throughout the general public. However, the mountain lion is a highly studied animal with information about its biology, diet, habitat, etc. well described. The mountain lion is an elusive animal so continued studies are difficult to complete due to creation of artificial experiences through animal tracking using dogs, trapping, and other methods therefore there is still much more to learn.

Information from studies is usually readily available to other scientists and wildlife biologists, as well as students, researchers, and other stakeholders with access to scholarly publications. The scholarly publications are largely unavailable to the general public leaving the public to educate themselves through television programming, local

news in print, on the internet, and live broadcast. These resources are often misleading and perpetuate myth and legends surrounding this stealthy animal.

Key to management is profit as stated many times within the study. The driver behind preservation of land and wildlife is its ability to provide a living. The mountain lion is at times at odds with major stakeholders such as landowners and ranchers. This is because they are in competition for space and diet. The mountain lion's diet is believed to effect the income of ranchers who raise mule deer for hunting. Profit is a common goal with hunters as well as other large stakeholders. Profit may be identified as a topic for collaboration between wildlife biologists, hunters, landowners, and other organizations who do not usually support conservation efforts.

Wildlife biologists already have an intimate relationship with their surround community and the area's ecology. They are well accepted by landowners, urban residents, and new residents moving to rural areas. This is due to their acceptance by the general public as subject experts and leaders within the community for wildlife tours, educational programs, and other needs for individual landowners. Wildlife biologists as a group identified areas where they may enhance their leadership abilities and become agents of change among other stakeholders thus promoting their engagement and acceptance of mountain lion management strategies. Developing wildlife biologists as influential leaders within their community addressing controversial issues, such as management that may include placing restrictions on mountain lion harvest, may be accomplished by adapting the Social Change Model (SCM) to guide facilitating positive social change within the general community through ecologically concerned societies,

individuals, wildlife and nature enthusiasts, and other historically environmentally concerned stakeholders.

Modifying the SCM model would require including the identified topics that effected the wildlife biologists' attitudes and perceptions (management, value, knowledge, profit, and history) of the mountain lion based on their unique experiences (Figure 7). The model may present an approach to leadership in mountain lion management as a purposeful, collaborative, value-based process resulting in change in mountain lion management strategies.

Opportunities should be created to develop effective leaders within the wildlife biologist community that may become agents of change. These leaders should be trained in a manner specific to their social structure and values so that as individuals and a group, they may have congruence in management strategies. As wildlife biologists begin to outline new concepts in mountain lion management, they as trained leaders, influence others in a manner that, over time, changes how other stakeholders view mountain lion management. This may lay the foundation for future mountain lion management strategies that are acceptable, effective, highly engaging, and sustainable.

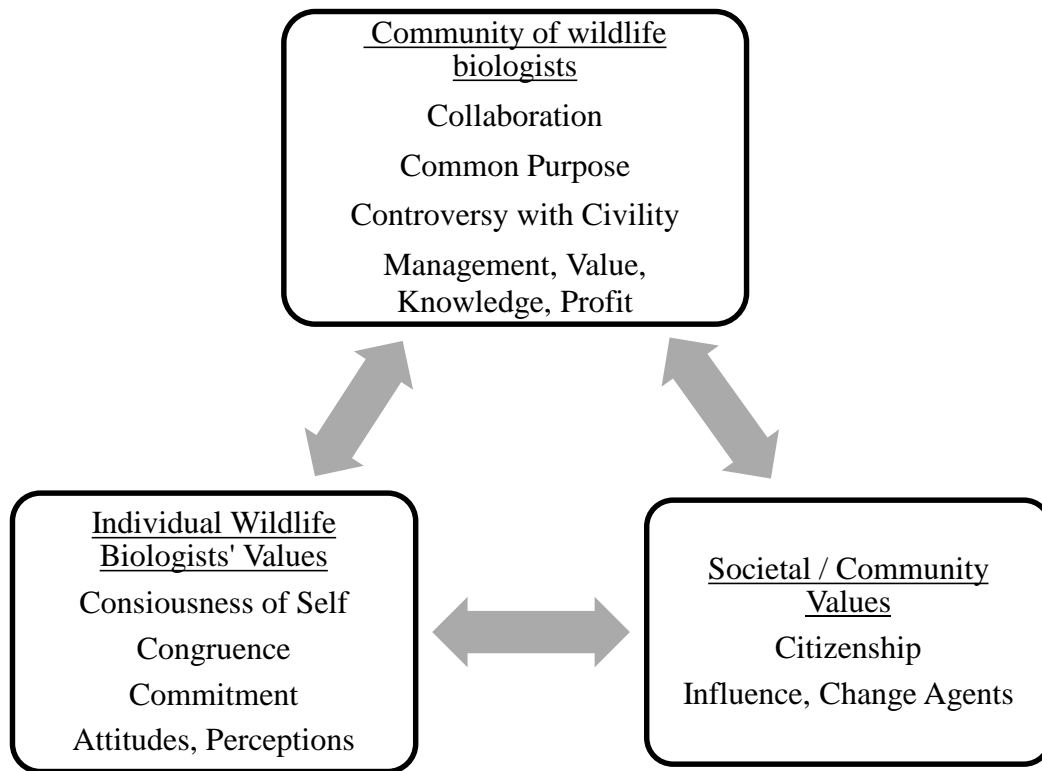


Figure 8. Modified SCM for leadership development in hunters. Reprinted from Komives & Wagner, 2009.

### Future Research

This study identified themes that suggested areas that wildlife biologists would most likely use as a reference for developing and implementing management strategies that are favorable and sustainable for the mountain lion and the stakeholder it affects. Wildlife biologists are concerned with the impact of the mountain lion Texas ecology. Lack of management schemes that are engaging and sustainable threaten the current stability of mountain lion populations.

Using the stakeholder method defined by Decker et al. (1996) wildlife biologists were identified as a key stakeholder group. Another key stakeholder group has previously been identified as hunters. Their attitudes, perceptions, and unique



experiences have been described illustrating their insights into mountain lion management. Future research should focus on identification of areas where hunters and wildlife biologists might be able to collaborate. This may help define leadership opportunities and promote hunters and wildlife biologists working together as change agents.

Developing the leadership skills to influence opinion leaders will require a leadership instruction that will include the hunters and wildlife biologists as students of leadership using the Social Change Model of Leadership (Higher Education Research Institute, 1996). Research may be done to assess the effectiveness of the model for developing change agents and creating leaders that may design, and implement mountain lion management strategies that are effective, accepted, and sustainable.

## CHAPTER IV

### HUNTERS AND WILDLIFE BIOLOGISTS AS COLLABORATIVE AGENTS FOR STAKEHOLDER ENGAGEMENT IN TEXAS MOUNTAIN LION MANAGEMENT

#### **Introduction**

The array of stakeholders in wildlife management has diversified and their expectations for involvement in decisions have increased (Riley et al., 2002). Various stakeholders have differing opinions regarding whether, when, and how mountain lions should be managed (Dandy et al., 2012). Judgements about which stakeholders to consider in a particular situation are not always clear (Decker et al., 1996). Those who are in direct proximity to management problems may foster opportunities for matching their professional expertise with diverse concerns among stakeholders (Kellert, 1994). Two important groups of management system are the wildlife managers who conduct the management activity and hunters who carry out harvest (Decker & Brown, 1987).

The mountain lion in Texas is legally classified as a non-game mammal with no designated hunting season or bag limit (Pena, 2002). The reported mountain lion densities in the two populations in Texas are the lowest densities in North America (Harveson et al., 2012). Aside from a state wide monitoring program of reported mountain lion sightings and mortalities, all information on mountain lion population derives from studies conducted on federal lands in the Trans-Pecos region of Western Texas where mountain lions are protected from harvest (Harveson et al., 2012). Generally, uncertainty about effects of human off-take pervades puma management (Logan et al., 2001). In West Texas the main cause of mountain lion death is attributed

to predator control and harvest (Harveson et al., 2012). Difficulties arise when opinion and perceptions of stakeholders are quantified on contentious issues where their views are often polarized and communication between groups is limited (Redpath et al., 2002). Wildlife biologists research the mountain lion out of passion for making a difference (Balmford & Cowling, 2006). Those who hunt the mountain lion obtain satisfaction from the hunt and are concerned that an enjoyable form of recreation will be taken away if their hunting opportunities are eliminated (Teel et al., 2002).

Community has emerged as a fundamental concept in wildlife management evident in the continually growing community-based approaches to management (Pratt, 2012). Community is a homogenous structure with shared norms that may be representative of a small unit such as hunters and wildlife biologists. Focusing on small units of communities may be advantageous and effective when designing management program (Argawal & Gibson, 1999).

Impact among stakeholders may involve a variety of human values. They are identified as significant with human-wildlife contact including wildlife management (Riley et al., 2002). Evaluating programs must express the benefits and costs of wildlife management in different manners (lifestyle, cost, attitudes, perceptions) to identify those greatest impacted and define where knowledge and collaboration of resources may be used to devise equitable management interventions (Balmford & Cowling, 2006).

The development of unique, creative, accepted management strategies and effectively communicating them, is an important factor in improving implementation of sustainable wildlife management (Balmford & Cowling, 2006). Participatory programs

foster this communication and trust between key stakeholders, agencies, and communities (Thornton & Quinn, 2010). Thus management strategies are mainstreamed into the everyday business of public and private stakeholders who value their engagement (Balmford & Cowling, 2006). This inquiry underscores the need for key stakeholders with collaboration of biological and social scientists to integrate community decision making for creation of sustainable, effective management strategies (Shaw & Negri, 2005).

### **Statement of Problem**

Mountain lions have no management strategy in place in Texas. They are not protected nor is harvest of these animals regulated. Designing and implementing effective management strategies that regulate harvest, and is mutually beneficial for people and the mountain lion, requires change that must be accepted across a range of stakeholders. Identifying key stakeholders that would be best suited for affecting this change is essential to designing these strategies. These stakeholders, as leaders, may become change agents in their community introducing these management strategies in Texas.

Individuals occupying comparable positions within society have shared relationships and experience with wildlife and may elicit similar attitudes, these are social norms (Dandy et al., 2012). Social structure positions are created by social norms and societal influence (Kendall et al., 2006). The integration of human perceptions and attitudes based on experiential knowledge with biological and ecological understanding

may provide the foundation for developing mountain lion management programs with increased stakeholder engagement and acceptance (Riley et al., 2002).

Agents of change are citizens of a social group or society that have a common purpose and approach controversy with civility as leaders introducing new ideas, or innovation (Rogers, 2003). Diffusion of Innovation as described by Rogers (2003) suggests that communication of the new idea happens over a period of time. It must be accepted by a citizens within a social group who have the desire to affect change.

Successfully affecting change requires the influence of attitudes and perceptions of opinion leaders. Therefore, understanding perceptions and attitudes of key stakeholders is important. Agents of change may be developed based on their common purpose, consciousness of self and identified opportunities for collaboration. The may be key in defining new management strategies in not only the mountain lion but other controversial wildlife.

### **Conceptual Framework**

Three models were combined to develop the conceptual framework: (a) the Stakeholder Approach (Decker et al., 1996), (b) the Sphere of Human Experience and Practice Related Values (Olilla,1996), and (c) The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996.

Social structure positions or social groups have a network of relationships and hierarchy of leadership along with established mutual support. This social organization is influenced by culture, a set of beliefs and values, established by attitudes and perceptions, which are learned and shared with others who participate in that social

environment Pena (2002) suggested one of key stakeholder groups with the most knowledge, experience, and influence is wildlife biologists. To most effectively design and implement sustainable management strategies, the network of relationships within the wildlife biologist profession may be capitalized creating leadership opportunities as agents of change while remaining sensitive to culture and relationships.

The stakeholder approach as described by Decker et al. (1996) involves the realization that there are many stakeholders in wildlife management. These stakeholders are effected by management decisions with or without their knowledge. Stakeholders have political interest, legal standing, and moral claims, wildlife biologists are defined as key stakeholders in this study because they have: (a) political influence, (b) legal standing, (c) power, (d) experience, and (e) moral claims (Decker et al., 1996; Susskind & Cruikshank, 1987).

Wildlife biologists have shared experiences with mountain lions thus may have unique experiences, attitudes, and perceptions which may be influential across the realm of stakeholders and advantageous as agents of change. This is best illustrated as the sphere of human experience and practice-related virtues. A “virtue is an acquired human quality, the possession and exercise of which tends to enable us to achieve those goods which are internal to practice and the lack of which effectively prevents of from achieving any such goods” (Ollila, 1996, p. 118). By practice it is meant “any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are ... appropriate to and partially definitive of, that form of activity ..., and human conceptions of the ends and goods involved are

systematically extended” (Ollila, 1996, p 118). Examples of practices are farming, biology, chess and others which may be extrapolated to include hunting and wildlife biology and management. Internal goods are those that can be attained only through this specific practice and can only be identified and recognized by the experience of participating in such practices. Therefore, only those who have experience in mountain lion behaviors, human – mountain lion encounters, mountain lion habitat, etc., will be those who may recognize experiences relating to their practice.

The stakeholder approach described by Decker et al. (1996) and the sphere of human experience and practice-related virtues described by Ollila (1996) may be applied to The Social Change Model of Leadership developed by The Higher Education Research Institute in 1996. This model approaches leadership as a purposeful, collaborative, value-based process resulting in positive social change (Komives & Wagner, 2009). It is based on five key assumptions; (a) leadership is concerned with affecting change on behalf of others and society, (b) leadership is collaborative, (c) leadership is a process rather than a position, (d) all students are potential leaders, and (e) service is a powerful tool for developing leadership skills.

The goals of the Social Change Model include enhancing student learning and facilitating positive social change at the institution or in the community. It defines seven dimensions of values referred to as the Seven C’s: (a) citizenship, (b) collaboration, (c) common purpose, (d) controversy with civility, (e) consciousness of self, (f) congruence, and (g) commitment (Komives & Wagner, 2009).

Although this model of leadership was developed for use by students of leadership, it may be modified and applied to changing societal views of wildlife management programs and engagement with sensitivity to the culture of hunting. In order for the model to be of greatest benefit, wildlife biologists would learn the model with emphasis on the second goal, facilitating positive social change at the institute and/or community. This is, collaboratively introducing actions that would assist communities in functioning more effectively and humanely. Wildlife biologists would in essence, design a collaborative leadership program using their sphere of influence to affect positive change on the community and their engagement in mountain lion management design and implementation creating a management scheme that is broadly acceptable, relevant, and sustainable.

Using the “Seven C’s” that all work together to accomplish social change, a model may be developed that guides the wildlife biologist’s collaborative efforts into more meaningful actions developing programs that may contribute to the community accepting management programs for the mountain lion, and other species, that function effectively and humanely.

For developing leadership in wildlife management and conservation, wildlife biologists must foster a community of acceptance and become agents of positive change. They develop their leadership through understanding themselves consciously, individual citizen and as a group. This involves understanding and relating to shared experiences. They reflect within and throughout the group. As a group, they uncover their attitudes and perceptions that are common to and they may easily use to build collaborations and



foster congruence. They can, as a group, commit to the common goal of stakeholder engagement in designing accepted, sustainable, and effective mountain lion management strategies that are inclusive of the values and beliefs of the culture of wildlife biology and management and the respectful to those stakeholders they influence.

### **Purpose of the Study**

The purpose of this study was to compare the attitudes and perceptions of two stakeholder groups, hunters and wildlife biologists, toward the mountain lion (*Puma concolor*) in Texas. Further, this study was to identify opportunities for hunters and wildlife biologists to collaborate as agents of change in stakeholder engagement in effective, accepted, and sustainable mountain lion management.

### **Research Questions**

1. What were the similarities between hunters and wildlife biologists?
2. What were the differences between hunters and wildlife biologists?
3. What threats existed against implementing effective management strategies for the mountain lion?
4. What opportunities existed for hunters and wildlife biologists to collaborate for engaging stakeholders in implementing effective management strategies for the mountain lion?

## **Methods**

### **Research Design**

This research used qualitative data to build a complex, holistic, case analysis of wildlife biologists and hunter's lifestyle, their experiences, its impacts, and what meaning (Merriam, 2009) they have in wildlife, specifically, mountain lion, management strategies. The researcher used the cross-case synthesis (Yin, 2009) to compare commonalities and differences in events, activities and processes within the Hunter's case study and the Wildlife Biologist's case study. The case study is an "empirical inquiry about a contemporary phenomenon, set within its real-world context" (Yin, 2009, p. 18).

The cross-case synthesis method was used to identify commonalities between the two cases and possible opportunities for collaboration in decision-making, design, and implementation of management strategies for the Texas mountain lion. Yin (2009) states synthesis of the data between the two cases strengthens the researchers' study data. Distinctive of the cross-case synthesis is explicit identification of rival explanations that might serve as further opportunities for learning within each group and support across each group (Yin, 2011). Where one group has strong linkages to the community, the other may have weak. Cross-case synthesis was performed by analyzing reoccurrence of themes and frequency of constructs within each case.

Strengths, Weaknesses, Opportunities, and Threats (S.W.O.T) analyses were also performed for each case. S.W.O.T. analysis is the structured planning method used to evaluate strengths, weaknesses, opportunities, and threats involved in a situation, active,

business, or venture (Jackson, Joshi, & Erhardt, 2003). S.W.O.T. analysis may capture the full spectrum of diversity within and between organizations, including the two defined key stakeholder groups, hunters and wildlife biologists.

The two cases included in this cross-case synthesis are; (a) six mountain lion hunters; and (b) four wildlife biologists in Texas having extensive experience with the two mountain lion populations found in the Trans-Pecos and brush lands of South Texas. The two cases served as the basis of the case study as they were a (a) social group, (b) of experienced and successful interactions and knowledge of the Texas mountain lion, and (c) may provide essential information about stakeholder response to mountain lion management. Each participant represented extensive knowledge and historical background of changes in mountain lion and other wildlife populations, wildlife value, and perceptions of the mountain lion by the community. Pena (2002) suggested hunters and biologists attitudes and perceptions should be further researched as these two groups have greater knowledge of the mountain lion, its habitat, biology, behavior, and the stakeholders affected by it.

### **Sampling Design**

The researcher attempted to collect all relevant information about the bounded case. Data were collected to reach a point of saturation. Data saturation is reached quicker the more homogeneous the participants are, the more structured the data collection instrument is (e.g. an interview protocol), and content complexity (Guest, Bunce, & Johnson, 2006). In qualitative nonprobabilistic research, saturation is when no new information or themes are observed in the data.

## **Researchers Role**

The researcher sought and received permission from Texas A&M University's Institutional Review Board (IRB) to conduct this research. A member Texas wildlife society introduced the researcher to a biologist well respected in the state of Texas. The researcher was invited in September 2013 to visit Alpine, Texas to meet individuals involved in mountain lion research. The researcher negotiated entry during the September and in subsequent interactions and conversations over the period of three months until the interviews began in January 2014. Negotiating entry occurs when a caring community is constructed among researcher and practitioners (Connelly & Clandinin, 1990).

A well-respected hunter in the community put the researcher in contact with a group of avid mountain lion hunters. The group invited the researcher in November of 2013 to visit with the group. The researcher visited with the group in December of 2013 negotiated entry. Negotiating entry occurs when a caring community is constructed among researcher and practitioners (Connelly & Clandinin, 1990). All participants see themselves as participants in the study in which both the practitioners and the researcher have a voice.

## **Data Collection Procedures**

The researcher was the primary instrument of data collection and analysis (Merriam, 2009). Data were collected during semi-structured individual interviews of four key informants with experience as biologists with extensive mountain lion background, publically attainable documents about the mountain lion in Texas and

across the United States, and artifacts supplied by key informants. Hunter's data was collected during an in-person focus group and personal interviews. Articles supplied by both hunters and biologists were accounted for by the researcher.

All interviewed subjects were 18 years of age or older. The researcher transcribed what each interviewee said during the interview. The taped interviews were transcribed verbatim for analysis. Transcripts were coded openly involving identifying, themes, naming, and categorizing topics found within the transcripts. The interviews lasted approximately 90 minutes. Additional questions, were asked if deemed relevant. The participants were interviewed at locations comfortable and familiar to them. Some chose to be interviewed over the phone versus having the researcher travel to them.

### **Data Analysis**

The researcher transcribed all data except photographs. The transcribed data was reduced and given individual codes. Segments of data were separated out to be coded if they were (a) meaningful (or potentially meaningful) to one or more of the research questions (Merriam, 2009); and (b) were "the smallest piece of information about something that can stand by itself" (Lincoln & Guba, 1985, p. 345). Data segments were identified according to an auditing system (Table 1). With the audit tag, data segments cited in the analysis, results, and discussion phases could be referred back its location and context in the raw data. The audit tag combined the data type and source and separated the number identifier with a period.

Table 4. Hunter's and wildlife biologists' data auditing trail.

Code Category	Code	Code Explanation
Data Type	H, B, RR, DA, AR	H: Hunter B: Biologist RR: Researcher Reflection DA: Document Analysis AR: Artifact
Data Source	1-999	Data sources within each type were given a number value
Page Number	1-999	Data sources within each type were given a number value
Line	1-999	Data sources within each type were given a number value
Construct	AT, P, V, AC	AT: Attitude P: Perception V: Value AC: Acceptance

For example, the data segment from hunter number one's interview and the construct attitude will be coded H1.4.56.AT. Data were analyzed using the five-tiered organizational approach described by Auerbach and Silverstein (2003). The five coding tiers are briefly described as:

- a) Relevant text: text related to the specific research concern or question;
- b) Repeating Ideas: similar words or phrases used to express the same idea by different participants;
- c) Themes: embedded topics that organize a group of repeating ideas;
- d) Theoretical constructs: the abstract grouping of themes; and
- e) Theoretical narrative: a summary of the research that "tells the story of the participants' subjective experience using their own words as much as possible."

## **Establishing Credibility, Bias, Consistency, and Transferability**

Credibility (referred to as internal validity in quantitative research) was established by collecting data from multiple sources (i.e. triangulation). Data were triangulated through interviews of biologists, researcher observations, media, artifact analysis, and peer briefing (Appendices A&B). Respondent validation, which allows respondents to view, comment on, or revise what they said (e.g. during the interview) was used to increase credibility (Merriam, 2009). The researcher transcribed the interview and sent to respective participants for their review and comments. The researcher visited a location familiar and comfortable for the participants, visited areas of mountain lion sightings, visited homes of participants to gather artifacts and stories, and visited research areas.

Research bias is a subjective bias towards a result expected by the human experimenter. For example, it occurs when scientists unconsciously affect subjects in experiments. Understanding research bias allows readers to critically and independently review the scientific literature and avoid results that are not credible (Pannucci & Wilkins, 2010). Researcher bias is more likely when the researcher is well versed on a topic adopting a defined attitude and perspective. Research bias was addressed by journaling the researcher's baseline understanding of mountain lion management and defining the opinion of mountain lion conservation. The research further documented opinions and attitudes toward the value of wildlife biology. Finally, the researcher reserved all review of relevant literature to after the interview process had concluded.

The researcher established consistency (referred to reliability in quantitative research) through the use of an audit trail, data triangulation, and reflexivity (Merriam, 2009). The audit trail consisted of the data auditing system (Table 4) of raw data and included personal notes, instrument development information, and proposal documents (Lincoln & Guba, 1985). Reflexivity, which is the process by which the researcher reflects upon him/herself as the primary instrument of data collection and analysis, was addressed through the reflexive memo instrument. Peer briefing, which is a process by whereby the researcher shares preliminary findings, conclusions, and analyses with experts was used to increase credibility and consistency.

Transferability (referred to as external validity in quantitative research) was established by providing rich descriptions of the findings (Lincoln & Guba, 1985; Merriam, 2009). Thick rich descriptions of qualitative data are highly descriptive presentations of the setting and findings, which help readers, apply the findings in other contexts.

## **Results**

### **Frequency of Themes**

The five common themes were: (a) management, (b) value, (c) knowledge, (d) profit, and (e) history. Hunters expressed a greater emphasis on management of programs for land, livestock, wildlife, and the mountain lion. Wildlife biologists placed more emphasis on the value of wildlife and the mountain lion. Themes were further analyzed for similarities and differences as a whole and illustrated in (Table 5).



**Similarities.** Each stakeholder group valued wildlife and the mountain lion's existence. Although the value was for differing reasons between both groups, continued existence of the mountain lion was expressed positively. Hunter's expressed their value stating, "[the mountain lion] is the last wild thing in Texas that would put a chill up your spine if you run into him in the wild" (H1.7.181.P). Wildlife biologists expressed, "[the mountain lion is] an apex carnivore, they effect the entire part of our system" (B1.6.162.V).

Each stakeholder group desires some form of management strategy for the mountain lion. Hunters expressed, "Ought to be a state program" that uses "facts that we shouldn't kill the lions at a certain time of year" (H1.8.199.A). Wildlife biologists stated, "mandatory reporting of takes from trappers and hunters would be a good start" (B1.13.452.P).

However both recognize that government involvement is not desired. Hunter's feel government involvement is equivalent to someone "going to tell you where to plow and how to do it and they don't know the last thing about it" (H3.5. 114. P). Where biologists recognize there is "a knee jerk reaction against participating in federal programs" (B2.3.75.P).

Lack of information, or false knowledge base, was a common issue across both stakeholder groups. Hunter's expressed "public knowledge of the [mountain] lion is pretty poor" (H1.10.251.P). Further, most people "have heard stories or maybe seen some tracks" (H6.11.312.P). Wildlife biologists agree stating, "not a lot of information" exists (B1.6.182.P) and "people are just uninformed" (B4.15.546.A).

History of land use was agreed upon as the greatest use of land is for livestock operations. Both stakeholder groups realize there is a greater trend toward “absentee ownership” (H1.1.5.P; B2.3.65.AC). They both agree progressive changes have been achieved in wildlife management. Historically wildlife was managed by lethal methods. There was the “historic removal of wolves and bison” (B2.5.142.AC) and “we didn’t have lions, coyotes, or nothing down here because of the trappers and ranchers all caught them” (H1.10.275.AC).

**Differences.** There is a great difference in knowledge of existing land and wildlife management practices. Hunter’s typically responded that they did not understand many of the programs and do not bother to try to participate. Wildlife biologists represented a difference within the group. Some being more knowledgeable in land and wildlife management practices, while others had no knowledge of wildlife management practices.

Hunters believe that profit is a benefit to all wildlife including mountain lions. One participant stated “Texan’s ...become a lot more altruistic when there’s profit in it” (H1.5.123.A). He continues to express profit as “not a bad thing. It helps people justify using a piece of land and still leaving it so that it benefits all wildlife” (H1.5.119.P). Wildlife biologists state there is a great potential for conflict between deer hunting operations and mountain lions as “mountain lions eating their deer that could potentially bring in a couple thousand dollars...competing for resources” (B2.11.389.P).

There remained a difference in knowledge of the mountain lion. Hunters admitted that they tend to depend on media to provide them with information about the

mountain lion. All I know is what “I read in the newspaper” (H1.6.150.AC). They also have distrust of information from wildlife organizations stating there are “inflated numbers coming from wildlife and inflated numbers of animals actually trapped” (H6.11.301.AT). Wildlife biologist agree there is a general dependence on voluntary reporting of mountain lion sightings. These reports are commonly received through websites. One participant stated, “voluntary reports fluctuate based on many factors unrelated to mountain lions” (B2.7.237.P). He cites several examples including media such as television shows, online information, and news.

The knowledge difference is in access to information. Hunters remain dependent on media due to their (and the general public’s) inability to access scientific journals and trustworthy sources. Wildlife biologists state “Scientists have access to journals, there is plenty... just for the general public not much at all” (B1.6.182.P).

Profit also produces a difference between the two groups in the mountain lion’s actual effect on profit due to depredation. One participant states “as long as they’re not destroying my livestock... I like them around” (H3.7.178.AT). However wildlife biologists state that even though the mountain lion is known for taking sheep and goats, its main diet is deer however, there remains conflict with ranchers who “have hunting ranches and get some of their income from deer” although we don’t know the actual impact on the business as we are still researching “if they are taking the weak, sick, and small deer and leaving the trophy bucks” (B1.11.368.V).

Table 5. Similarities and differences between hunters and wildlife biologists

Theme	Theme Operationalized	Response to Theme	
		Similar	Different
Value	Questions and answers related to how wildlife and mountain lions are valued by members of the hunting and biologist communities.	Experience	Hunting
Management	Wildlife management; harvest management; land management	Desire for some form of harvest management	Knowledge of current management strategies
Knowledge	Facts, truths or principles, as from study or investigation; general erudition of land management, wildlife management.	Not enough knowledge; misconceptions	Hunter's trust and dependency in media
Profit	Returns, proceeds, or revenues from land, agriculture, and wildlife	Wildlife is beneficial to profit	Mountain lions may not take profitable "prize" deer
History	Record and account of past events in land ownership, wildlife management, and mountain lion ranges	Lethal means of wildlife management	Hunter's historic involvement in wildlife management to preserve hunting activities

## **S.W.O.T. Analysis of Hunters and Wildlife Biologists**

**Strengths.** Hunters tended to have more experience with the mountain lion in its native habitat. They describe an understanding of behaviors without introducing artificial behaviors etc. attributed to research conducted in confined areas, experience with the mountain lion through trapping and darting. One participants stated, “Even most [mountain lion] biologists that work with wildlife might only see a mountain lion when they have dogs chasing it up a tree and they dart it or put a collar on it or something” (B2.7.203.P).

Hunters have a unique relationship with landowners in Texas. Landowners are the largest stakeholders in Texas. Many of the landowners depend on hunters as a portion of their income through hunting leases and hunting expeditions. They have a sustained relationship and therefore, hunters and their activities have a direct influence on landowners as “many of [landowners] are hunters” (H6.12.315.AC). Hunters have an established history in wildlife management as lobbyists in support of conservation and protection of species as well as having the ability to hunt.

Wildlife biologists have the greater amount of and access to, science-based knowledge. This is true for mountain lions even though “research on cat populations is extremely difficult” (B2.8.254.P). Their access to scientific research and public trust, wildlife biologists have become advocates for nature as well as the public interest through extension education, youth programs, camping and fishing learning activities, and the establishment of licenses for hunting, fishing, and other activities with revenue that supports wildlife management activities (TPWD).

Wildlife biologists have an established, positive relationship with hunters through support, advocating, and education. This relationship exists from licensing and management of game to advising hunters and nature enthusiasts (Sweanor & Hornocker, 2001).

**Weaknesses.** Hunters have two main weaknesses identified, limited biological knowledge and limited knowledge of state and federal land and wildlife management programs. Participants state they typically are not engaged in programs due to “too much red tape and too much bull” (H2.5.111.P).

Wildlife biologists have here main weaknesses identified; a) ability to access private lands, b) limited indigenous knowledge, and c) no mountain lion management tools. Participants state that;

Even most biologists those who are mountain lion biologists, that work with wildlife they might only see a mountain lion when they have dogs chasing it up a tree and they dart it to put a collar on it or something (B2.7.203.P)

Further, participants agree, “there are no tools with which to manage [mountain lions]... tools being regulations” (B2.14.472.P).

**Threats.** The greatest to threat to both key stakeholder groups is media. Media may be in the form of online publications, television shows aired on popular networks, pictures, written and produced news, and word of mouth. Due to multiple types of media, hunting has gained a negative public image. By the same venue, false information has been disseminated into the community about the mountain lion.

Hunters face the threat of decreasing numbers of educated and licensed hunters. They are further threatened by urban ideals in rural settings. One participant stated their ideas of “federal parks and that’s the worst thing. [Mountain lions] are getting more used to people” (H2.7.172.P).

Wildlife biologists face the threat of landowner distrust of government management strategies and absentee ownership. Participants state, “Communities would want as little federal or state interference” (B3.14.498.AC).

**Opportunities.** There are however three main opportunities for hunters: (a) positive public outreach, (b) collaborative approach to hunting education, and (c) absentee landowners. Participants’ state landowners typically do not reside on their property, “Fella’s in Brisco own it all” (H2.5.5.P). Further, there are “more people on leased land that they’re taking care of” (H1.3.62.P).

There are two main opportunities for wildlife biologists, public interest in such a charismatic animal such as the mountain lion and urban populations relocating rural areas. They agree mountain lions are “charismatic carnivores that draw interest and attention” (B2.8.279.P). One participant states, “there’s been a large shift to newer landowners coming in” (B3.2.26P).

### **Conclusions, Implications, and Recommendations**

This cross-case analysis of hunters and wildlife biologist focused on defining similarities and differences in hunter’s and wildlife biologists’ attitudes and perceptions of the mountain lion. Identification of these led to defining opportunities for collaborative efforts for engaging other stakeholders in mountain lion management.

Each case was an identification and discussion of five main themes that define hunter's and wildlife biologists' perceptions and attitudes: (a) management, (b) value, (c) knowledge, (d) profit, and (e) history. Discussions of each were not only focused on the groups as a collective, but as individuals with illustrations of their unique mountain lion experiences and definition of their attitudes and perceptions. Many times, in each case, participants described attitudes that were similar to each other, as is expected within a social construct (group), yet they were also similar to those of the other case. This suggests that there may be greater similarities than differences.

The study reveals that though the desire for implementation of a relevant and accepted management plan or plans for the mountain lion is shared, the motivations for such plans are strikingly different. For hunters, the motivation, and attitude toward the mountain lion is still reverence and respect for existence although its existence is desired for the sport of hunting and the feeling of the wild. For the wildlife biologist, the motivation is for ecological stability and reverence of the mountain lion. Wildlife biologists' respect for the mountain lion is not only born of biological needs as a wildlife manager but from an affection for the animal.

The findings suggest that hunters and wildlife biologists' greatest opportunities for collaboration as agents of change are through positive public outreach and education, and re-engagement of absentee landowners. Wildlife biologists already have an intimate relationship with their surrounding community and hunters have an established business as well as personal relationship with landowners. The two social structures identified similar areas where they may enhance their leadership abilities and become agents of



change among other stakeholders thus promoting their engagement and acceptance of mountain lion management strategies. Developing the individuals as influential leaders within their community addressing controversial issues, such as management that may include placing restrictions on mountain lion harvest, may be accomplished by adapting the Social Change Model (SCM) to guide facilitating positive social change within the general community through ecologically concerned societies, individuals, wildlife and nature enthusiasts, and other historically environmentally concerned stakeholders.

Modifying the SCM model would require including the identified topics that effected the attitudes and perceptions (management, value, knowledge, profit, and history) of the mountain lion based on their unique experiences (Figure 8). The model may present an approach to leadership in mountain lion management as a purposeful, collaborative, value-based process where the individuals from each group would identify themselves with the attitudes and perceptions expected from each social structure. The two groups would then come together, discover complementing attitudes and perceptions and define how they may collaborate. Finally, the two groups may recognize themselves as one group of change agents with the common goal of change in mountain lion management strategies.

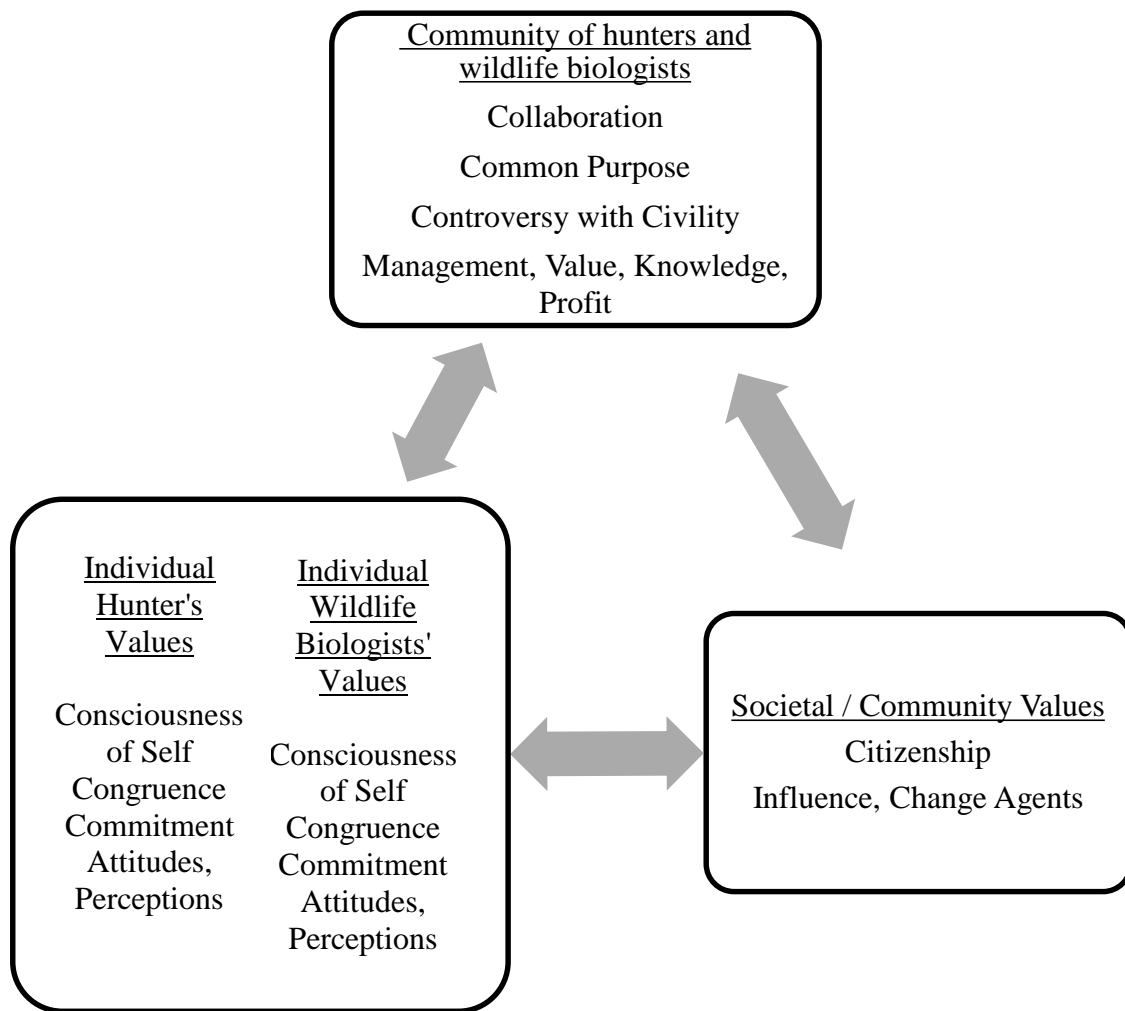


Figure 9. Modified SCM developing two individual communities as leaders then establishing them as a collaborative in order to affect positive social change. Reprinted from Komives & Wagner, 2009.

Opportunities should be created to develop effective leaders within the wildlife biologist community that may become agents of change. There remains a need for

leadership courses for future wildlife professionals that is specific to the wildlife profession and required for successful completion of education at either the undergraduate or graduate level. Further, there exists a need for creative leadership training within current professionals that promotes dynamic management through collaboration.

Hunters may have the opportunity to be exposed to this type of leadership training. Creating creative, effective leadership within the hunting population may serve two purposes. They may benefit from realization of creative practices for recruiting new hunters. As hunting numbers decline, profit declines, and funding for parks and wildlife programs decreases from decreasing sales of licenses and other products. Developing dynamic strategies for sustaining the number of hunters. This training may also benefit them in public outreach and perception. A negative image of hunters persists within the American, mostly urban, population. Allowing hunters the opportunity to participate in this type of leadership may help them develop best practices for public outreach, changing public opinion, and creating greater acceptance of the need harvest of species, including the mountain lion.

These groups should be trained in a manner specific to their social structure and values so that as individuals and a group, they may have congruence in management strategies. As key stakeholders begin to outline new concepts in mountain lion management, they as trained leaders, influence others in a manner that, over time, changes how other stakeholders view mountain lion management. This may lay the

foundation for future mountain lion management strategies that are acceptable, effective, highly engaging, and sustainable.

### **Future Research**

This study identified areas where hunters and wildlife biologists might be able to collaborate. This may help define leadership opportunities and promote hunters and wildlife biologists working together as change agents. Developing the leadership skills to influence opinion leaders will require a leadership instruction that will include the hunters and wildlife biologists as students of leadership using the Social Change Model of Leadership (Higher Education Research Institute, 1996). Future research assessing the effectiveness of the model may define its effectiveness for developing leaders that are change agents influencing design, and implement mountain lion management strategies that are effective, accepted, and sustainable.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### **Conclusions**

The investigations were reported in a three article format. Each article had a set of related research questions. Article 1 and Article 2 had similar research questions as individual case studies. The two cases had unique results although participants in both cases had common interests, Article 3, the cross-case analysis had questions related to similarities and differences between the hunters and wildlife biologists and identifying what threats and opportunities existed for collaborative efforts toward engagement in mountain lion management strategy development and implementation. The cross-case analysis revealed many strengths and weaknesses between the two cases and how the individual groups may support each other in cases where one group is weaker than the other.

#### **Hunters**

Hunters would seem an unlikely key stakeholder group when it comes to designing and implementing management programs for the mountain lion. Programs that may put restrictions on their ability to hunt at certain times of year, hunt certain animals, or decrease the amount they are allowed to take. However, their description of their experiences reveals that hunters are concerned about the continued existence of the mountain lion. They were quite aware of the hunter's historical involvement in conservation and preservation of the land. They agreed there is a need for management

and they would support a well-designed and properly implemented management program.

The study suggests that hunters should have the opportunity to become trained in leadership and would be effective agents of change. Using the SCM, hunters may find topics that they may work together within themselves and in collaboration with other key stakeholders such as wildlife biologists. Their unique relationship with landowners in both a working and financial relationship, is social capital that may be leveraged in a manner that hunters are the stakeholders able to effectively influence the engagement of landowners. Key stakeholders may use their strengths and weaknesses in a manner that each group is supportive of the other. The unique relationship with land owners may allow for greater engagement with a traditionally anti-conservationist stakeholder population.

### **Wildlife Biologists**

Wildlife biologists spent most of their interview discussing their unique experiences with the mountain lion. They were passionate and educational. Further, although each had their unique experience and understanding, there exists a common purpose. That in mind, it would seem that as a key stakeholder group, the passion would be enough to influence others to engage in management programs. However, it was evident that their weaknesses lie in the ability to access private land owners due to the perception of government and regulation.

Conversely, wildlife biologists are well engaged with multiple stakeholders including urban and suburban populations wishing to learn about and get closer to

nature. They are able to interact with stakeholders in multiple educational venues, communicate effectively through interactive programs, and promote positive perception of the mountain lion. This is most important as management of the mountain lion remains a conflict with civility. Having identified these strengths and weaknesses will help wildlife biologists utilize the SCM as they have congruence, and are able to move into collaborating within the group as well as with other key stakeholders such as the hunters.

### **Hunters and Wildlife Biologists as Collaborate Agents of Change**

The two stakeholder groups strongly agreed the continued existence of the mountain lion was important to them. Although, the desire for management differed between the two. Therefore having insight into the difference in value of the mountain lion between the two stakeholder groups may be invaluable information that drives how the two groups may collaborate and deliver more inclusive messages for the need of mountain lion management. Their differences are not such that they cannot collaborate in a meaningful way to become change agents. Identification of the differences between the two groups helps define the individual groups to each other, one part of the SCM, consciousness. This begins at the individual, or individual group level, as this basis is developed, the two groups may move into finding congruence and opportunities for collaboration.

Stakeholders should be charged with developing and sustaining effective collaborations with multiple stakeholder groups while promoting trust and communication as critically important objects. Social groups are dynamic, and specific

management goals and norms may not necessarily exist in the future. Therefore, trust and communication will be key in future adjustments to management strategies and implementation of community-wide efforts.

The analysis suggested both stakeholder groups were interested in the opportunities for collaborative efforts such as; a) combining social capital and resources in a manner that one key stakeholder supports the other, b) designing and implementing positive public outreach programs supporting both stakeholder groups, and c) benefitting from the public's natural interest in such a charismatic animal as the mountain lion.

Combining social capital is taking the strongest linkages to the community that each group has and creating a cohesive relationship between them. For instance, urban populations tend to hold TPWD in high regard for their ability to generate and communicate scientifically relevant and socially appealing information and activities. The movement of urban populations into rural areas is taking those ideals with them. Wildlife biologist may be able to take the trust of this population and use it to change the face of hunting for the positive. On the other hand, hunters who have strong linkages to absentee landowners due to hunting and other type land leases, may be able to use the trust of that population in order to provide more opportunities for biologists to have access to land for biological studies of the mountain lion.

Designing and implementing positive public outreach programs supporting both key stakeholder groups involves active participation from members of both groups in the area of education. Currently, TPWD supports the efforts of hunting instruction with camps, classes and other activities that draw positive attention to the sport. Decreasing



hunter numbers are a threat to both the skill of hunting (Adams, 2000) and a revenue source for TPWD. Hunters may compliment this effort by alleviating the “knee jerk reaction” to government programs landowners may have. Landowners as one of the largest lobbying groups in the state historically have resisted changes to wildlife management priorities. Hunters who are well educated and promote inclusion may have a unique niche due to their close relationship and their economic resource. Transparency, between the key stakeholder groups and those which they desire to influence, is paramount. This is especially true for hunters as they have the tendency to have a negative public image when it comes to wildlife, biodiversity, management, and conservation efforts.

### **Recommendations**

Currently, mountain lion populations in Texas are considered stable. However, how unregulated harvest and lack of management strategies will impact the future stability of this keystone species in ever decreasing habitats and increasing human – wildlife conflict, needs to be understood. This understanding requires stakeholder input from both those who are traditionally experts and opinion leaders, such as hunters and wildlife biologists, to landowners, ranchers, and the general public. Pena (2002) previously suggested that two key stakeholders for identifying management strategies would be hunters and wildlife biologists. This study has identified their attitudes and perceptions of the mountain lion, yet has also identified other key stakeholders.

More research is recommended to identify other opinion leaders whose expertise may not be the mountain lion itself, but policy, land management, urban wildlife

management, and agriculture leadership. The identification of these other influential stakeholders would allow for understanding of their attitudes and perceptions as well as their willingness to engage in mountain lion management. Three stakeholder groups that may be identified are ranchers, farmers, and extension agents.

Ranchers in Texas have increasingly turned to hunting deer, the main portion of the mountain lion diet. This causes competition for resources and requests for removal of mountain lions from hunting lands that are natural mountain lion habitat. This human-wildlife conflict is common with other states with mountain lion populations, such as Colorado, and requires more biological research of the effect of mountain lion take on sport hunting thus effecting rancher's profit, livelihood, and value of the mountain lion.

Farmers who raise livestock such as goats and sheep are also vulnerable to mountain lion take. Farmers understand that historically and currently mountain lions have caused negative impacts on their livelihood due to depredation. This conflict is also common and difficult to address as it is known that the take heavily impacts the farmer causing a negative attitude toward regulated management. Ranchers and farmers alike, benefit from the lack of regulation and management of the mountain lion as they may remove as many animals, by any method they wish, without penalty.

Extension agents have a background in leadership, diffusion of innovation, and education. Though they may not have direct experience with the mountain lion, they are effective educators and agents of change. Extension agents with an animal science, farming or ranching background may be most influential as they have a common background with farmers and ranchers and are trusted leaders in the community.

Further, more social scientists should be involved in describing how the main themes suggested in this research of value, management, profit, knowledge, and history effect their attitudes and perceptions of the mountain lion, the willingness to engage in large scale management programs, and how they might engage. The opportunity to conduct qualitative, in-depth, highly descriptive inquiries would add depth and breadth to the human factor of mountain lion management. This may lead to increased understanding of best practices for actively engaging stakeholders in wildlife management programs for all species.

This research suggests using the Social Change Model (SCM) to develop leadership within the two social groups of hunters and wildlife biologist. This model not only serves to teach leadership, but to encourage identification of common purposes, topics for collaboration between groups, and how they may bring about positive social change using their individual and collective leadership skills. Both social groups may become greater agents of change within their social structures and through other stakeholders who they have strong relationships.

Expanding upon this, the other identified social groups, ranchers, farmers, and extension agents, may also further develop their leadership skills and become effective agents of change. This follows diffusion of innovation as successful application of the SCM may be spread leading to the spread of new ideas and subsequent change. The SCM has been used in agriculture education related studies and may be a powerful tool in developing stakeholder leadership and collaboration instruction. Both agriculture

leadership and wildlife management may find that the SCM helps them more effectively leverage human capital.

Addressing issues of human-wildlife conflict, no matter the species, habitat, human population, or location will continue to be a challenge as the global population increases, the land needed to produce food and fiber for the increasing population increases, and attitudes towards wildlife and conservation change. Creative forms of leadership such as the SCM that first focus on consciousness of self may be effective in achieving dynamic, effective, acceptable, and sustainable management strategies for the mountain lion and other species.

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